

<b>HEALTH AND SAFETY PLAN FORM</b> <b>OTIE Health and Safety Program</b>		<i>This document is for the exclusive use of OTIE its subcontractors, and EPA.</i>		<b>OTIE</b> <b>Site Name:</b> Humboldt Mill Site/ TDD: TO-05-11-02-0005																															
<b>PROJECT NAME:</b> Humboldt Mill Site <b>PROJECT#:</b> 2010101-2001 <b>LOCATION:</b> 4547 County Road 601 Champion, MI 49814	<b>DATE:</b> 21-Oct-11  <b>CLIENT:</b> EPA <b>EPA CONTACT/PHONE #:</b> Nuria Muniz/312-886-4439 <b>LOCAL/SITE CONTACT PHONE #:</b>	<b>INCIDENT DESCRIPTION:</b> A former mining and milling facility was opearted the Site. START will identify, characterize and collect samples for use in HRS scoring.																																	
<b>ANTICIPATED TASKS:</b> <b>(e.g. collect surface soil samples):</b> START will conduct a site reconnaissance and collect soil/sediment and water samples.		<b>SOURCE OF PRELIMINARY INFORMATION:</b> Michigan Department of Enviromental Quality (MDEQ)																																	
<b>TYPE:</b> <i>Check as many as applicable</i>		<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">Active</td> <td style="width: 10%; text-align: center;">(X)</td> <td style="width: 20%;">Landfill</td> <td style="width: 10%; text-align: center;">()</td> <td style="width: 20%;">Spill</td> <td style="width: 10%; text-align: center;">()</td> </tr> <tr> <td>Inactive</td> <td style="text-align: center;">()</td> <td>Uncontrolled</td> <td style="text-align: center;">()</td> <td>Fire</td> <td style="text-align: center;">()</td> </tr> <tr> <td>Secure</td> <td style="text-align: center;">()</td> <td>Industrial</td> <td style="text-align: center;">(X)</td> <td>Military</td> <td style="text-align: center;">()</td> </tr> <tr> <td>Unsecure</td> <td style="text-align: center;">(X)</td> <td>Recovery</td> <td style="text-align: center;">()</td> <td>Unknown</td> <td style="text-align: center;">()</td> </tr> <tr> <td>Enclosed space</td> <td style="text-align: center;">()</td> <td>Well Field</td> <td style="text-align: center;">()</td> <td>Other (specify)</td> <td style="text-align: center;">(X) Former Mining Facility</td> </tr> </table>				Active	(X)	Landfill	()	Spill	()	Inactive	()	Uncontrolled	()	Fire	()	Secure	()	Industrial	(X)	Military	()	Unsecure	(X)	Recovery	()	Unknown	()	Enclosed space	()	Well Field	()	Other (specify)	(X) Former Mining Facility
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<b>DESCRIPTION AND FEATURES:</b> <i>Include principal operations and unusual features (containers, buildings, dikes, power lines, hillslopes, rivers, etc.)</i> <p>The property to be investigated is an approximately 1,242-acre parcel of in a mixed residential and rural area. It contains a buried pyrite trench, a tailings disposal facility (the Humboldt Tailings Disposal Facility [HTDF]), a former diesel and gas underground storage tank (UST) area, a crusher plant, an old crusher building, an electrical substation, an Office/Maintenance building, a main Mill building, a pyrite above-ground storage tank (AST), a former pallet plant, a former concentrate plant, a former pyrite stockpile, the south storage pile A, a fuel oil AST, a former leach residue stockpile, a stormwater outfall, a septic system, and multiple tailings ponds.</p> <p>The Site is relatively flat, with surface water from the northern and northeast portions of the Site draining to wetland EE. Water from wetland EE ultimately drains into the Middle Branch of the Escanaba River. Surface water from southwestern portions of the Site is draining to Wetlands on the southwest side of the site and surface water from the : <a href="#">Display Form</a> portions of the Site draining to the wetlands of Lake Lory. Water from both these wetlands ultimately drains into the Black River.</p>																																			
<b>SURROUNDING POPULATION:</b> (X) Residential    () Industrial    () Commercial    (X) Rural    () Urban    () Other:																																			



## **OTIE Health and Safety Program**

**OTIE**  
**Site Name: Humboldt Mill Site**

*Summarize conditions that relate to hazard. Include citizen complaints, spills, previous investigations or agency actions, known injuries, etc.*

In August 2008, Foth Infrastructure and Environment, LLC (Foth), completed a combined Phase I and Phase II Environmental Site Assessment (ESA) for the Site. The Phase I ESA identified recognized environmental conditions (REC) that indicated either the potential for the release of hazardous materials to the environment or that a release had occurred. The Phase II ESA was conducted to determine the presence or absence of hazardous substances related to the RECs identified during the Phase I ESA. As part of the Phase II ESA, Foth collected soil, groundwater, surface water, sediment, and stockpile samples.

**WASTE CHARACTERISTICS:** *Check as many as applicable.*

☐ Inert Gas      ☒ Unknown      ☐ Other, Specify:

*Describe the Exclusion, Contamination Reduction, and Support Zones in terms on-site personnel will recognize*

To be determined on site.

<input type="checkbox"/> Heat Stress	<i>attach guidelines</i>	<input checked="" type="checkbox"/> Noise
<input checked="" type="checkbox"/> Cold Stress	<i>attach guidelines</i>	<input checked="" type="checkbox"/> Inorganic Chemicals
<input type="checkbox"/> Explosive/Flammable		<input checked="" type="checkbox"/> Organic Chemicals
<input type="checkbox"/> Oxygen Deficient		<input checked="" type="checkbox"/> Motorized Traffic
<input type="checkbox"/> Radiological		<input checked="" type="checkbox"/> Heavy Machinery
<input type="checkbox"/> Display Form		<input checked="" type="checkbox"/> Slips, Trips, & Falls

fy: quick sand

Disposed mine waste in on-site taling pond/lake. Also disposed pyrite in a buried trench on-site. Several stockpiles of pyrite and other unknown material are also located on-site.

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<b>OTIE Health and Safety Program</b>		<b>Site Name:</b> Humboldt Mill Site			
<b>HAZARDOUS MATERIAL SUMMARY:</b> <i>Circle waste type and estimate amounts by category.</i>					
<b>CHEMICALS:</b> <i>Amount/Units:</i>  Cyanides Unknown  PCBs and VOCs Unknown	<b>SOLIDS:</b> <i>Amount/Units:</i>  Metals Unknown	<b>SLUDGES:</b> <i>Amount/Units:</i>	<b>SOLVENTS:</b> <i>Amount/Units:</i>	<b>OILS:</b> <i>Amount/Units:</i>	<b>OTHER:</b> <i>Amount/Units:</i>
<b>OVERALL HAZARD EVALUATION:</b> ( )High   ( )Medium   ( )Low   (X)Unknown <b>JUSTIFICATION:</b>					
<b>FIRE/EXPLOSION POTENTIAL:</b> ( )High   ( )Medium   (X)Low   ( )Unknown					
<b>INFORMATION COMPLETE:</b> ( )Complete                    ( )Incomplete                    (X)Best Available at Current Time					

HEALTH AND SAFETY PLAN FORM				This document is for the exclusive use of OTIE its subcontractors, and EPA.		OTIE
OTIE Health and Safety Program				Site Name: Humboldt Mill Site		
KNOWN CONTAMINANTS	NIOSH REL (ST if Available) ppm or mg/m3 (specify)	OSHA PEL (ST if Available) ppm or mg/m3 (specify)	IDLH ppm or mg/m3 (specify)	SYMPTOMS & EFFECTS OF ACUTE EXPOSURE	PHOTO IONIZATION POTENTIAL	
PCB	0.001 mg/m3	0.5 mg/m3 (skin)	5 mg/m3	Irritation eyes, skin, chloracne, liver damage, reproductive effects, [potential occupational carcinogen]		
Lead	TWA 0.050 mg/m³	TWA 0.050 mg/m³	100 mg/m³	Lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypotension	N/A	
Mercury (Metallic)	Hg Vapor: TWA 0.05 mg/m³ [skin] Other: C 0.1 mg/m3 [skin]	C 0.1 mg/m³	10 mg/m³	Irritation eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, indecision, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	N/A	
Arsenic (Inorganic)	Ca C 0.002 mg/m³ [15-minute]	TWA 0.010 mg/m³	5 mg/m³	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin, [potential occupational carcinogen]	N/A	
Benzene	Ca, TWA 0.1 ppm, ST 1 ppm	TWA 1 ppm, ST 5 ppm	Ca (500 ppm)	Irritated eyes, skin, and nose, dizziness, headache, nausea, staggered gait	9.24eV	
Cadmium	None	TWA 0.005 mg/m³	9 mg/m³	Pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	N/A	
Chromium (Metal)	TWA 0.5 mg/m³	TWA 1 mg/m³	250 mg/m³	Irritation eyes, skin; lung fibrosis (histologic)	N/A	
Chromium (II)	TWA 0.5 mg/m³	TWA 0.5 mg/m³	250 mg/m³	Irritation eyes; sensitization dermatitis	Properties vary	
Chromium (III)	TWA 0.5 mg/m³	TWA 0.5 mg/m³	25 mg/m³	Irritation eyes; sensitization dermatitis	Properties vary	
NA = Not Available	NE = None Established		U = Unknown	Attach, to this plan, an MSDS for each chemical you will use at the site.		
S = Soil A = Air	SW = Surface Water GW = Ground Water	T = Tailings SL = Sludge	W = Waste D = Drums	SD = Sediment OFF = Off-Site		

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OTIE Health and Safety Program				Site Name: Humboldt Mill Site	
Task Description / PPE / Personnel & Responsibilities				(attach additional sheets as necessary)	
<b>Task 1 Description</b>	Site Reconnaissance/ Inside KEL Property Protection as determined on-site			<b>**Hearing</b>	<b>Type</b> Intrusive
<b>Hazard Schedule</b>	Low				
<b>Primary Level</b> D	Respiratory: _____ Eyewear: Safety Glasses Hard Hat Boots: Steel-Toe Gloves: Leather Gloves	<b>Contingency Level</b> C	Respiratory: full face respirator with P100/multipurpose cartridge Eyewear: full face respirator Boots: Steel toe boots with rubber booties Gloves: Inner: Latex Outer: Nitrile		
<b>PPE:</b>	Clothing: Level D or Tyvek and High Visibilty Vest**			<b>PPE:</b>	Clothing: Saranex coverall
<b>Task 2 Description</b>	Sample Collection/Upgrade to level "C" if VOC reading is between 5ppm and 25ppm.			<b>Type</b> Intrusive	<b>Hazard Schedule</b> Low
<b>Primary Level</b> D	Respiratory: _____ Eyewear: Safety Glasses Hard Hat Boots: Steel-Toe Gloves: Outer: Nitrile	<b>Contingency Level</b> C	Respiratory: full face respirator with P100/multipurpose cartridge Eyewear: full face respirator Boots: Steel toe boots with rubber booties Gloves: Inner: Latex Outer: Nitrile		
<b>PPE:</b>	Clothing: Level D or Tyvek and High Visibilty Vest			<b>PPE:</b>	Clothing: Saranex coverall
<b>Task 3 Description</b>	Decon/ Sample Packing			<b>Type</b>	<b>Hazard Schedule</b>
<b>Primary Level</b>	Respiratory: _____ Eyewear: Safety Glasses Hard Hat Boots: Steel-Toe Gloves: Leather Gloves	<b>Contingency Level</b> C	Respiratory: full face respirator with P100/multipurpose cartridge Eyewear: full face respirator Boots: Steel toe boots with rubber booties Gloves: Inner: Latex Outer: Nitrile		
<b>PPE:</b>	Clothing: Level D or Tyvek and High Visibilty Vest			<b>PPE:</b>	Clothing: Saranex coverall
<b>Task 4 Description</b>				<b>Type</b>	<b>Hazard Schedule</b> Medium
<b>Primary Level</b>	Respiratory: _____ Eyewear: _____ Boots: _____ Gloves: _____	<b>Contingency Level</b> Exit Area	Respiratory: _____ Eyewear: _____ Boots: _____ Gloves: _____		
<b>PPE:</b>	Clothing: _____			<b>PPE:</b>	Clothing: _____
<b>PERSONNEL AND RESPONSIBILITIES</b>					
<b>Name</b>	<b>Company/Agency</b>	<b>Training</b>	<b>Responsibilities</b>		
Raghu Nagam	OTIE	40-hour OSHA HAZWOPER	Project Manager		
Naren Babu	OTIE	40-hour OSHA HAZWOPER	Safety Coordinator		

HEALTH AND SAFETY PLAN FORM		This document is for the exclusive use of OTIE its subcontractors, and EPA		OTIE Site Name: Humboldt Mill Site
OTIE Health and Safety Program		Specify by task. Indicate type as necessary. Attach additional sheets if needed.		
<b>Tasks:</b> 2	<b>Instrument:</b> Photoionization Detector MultiRAE	<b>Level:</b> D C B	<b>Action Guidelines:</b> Less than 5ppm VOCs Between 5ppm and 25ppm VOCs/19.5-23.5%O2 Above 25ppm VOCs	<b>Comments:</b>
<b>Tasks:</b>	<b>Instrument:</b>	<b>Level:</b>	<b>Action Guidelines:</b>	<b>Comments:</b>
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<b>EMERGENCY CONTACTS</b>  Site Telephone _____ EPA Release Report # _____ OTIE 24-Hr Emergency #                      312-217-7003 Facility Management _____ Other (specify) _____ CHEMTREC Emergency #:                      1-800-424-9300			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 5px;">EMERGENCY CONTACTS</th> <th style="text-align: left; padding: 5px;">NAME</th> <th style="text-align: left; padding: 5px;">PHONE</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Health and Safety Manager</td> <td style="padding: 5px;">Bill Fink</td> <td style="padding: 5px;">414-234-7845</td> </tr> <tr> <td style="padding: 5px;">Project Manager</td> <td style="padding: 5px;">Raghu Nagam</td> <td style="padding: 5px;">312-217-7003</td> </tr> <tr> <td style="padding: 5px;">Site Safety Coordinator</td> <td style="padding: 5px;">Naren Babu</td> <td style="padding: 5px;">312-656-7685</td> </tr> <tr> <td style="padding: 5px;">Client Contact (EPA OSC)</td> <td style="padding: 5px;">Nuria Muniz</td> <td style="padding: 5px;">312-886-4439</td> </tr> <tr> <td style="padding: 5px;">Other</td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">State Agency</td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">State Spill Number</td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">Fire Department</td> <td></td> <td style="text-align: center; padding: 5px;">911</td> </tr> <tr> <td style="padding: 5px;">Police Department</td> <td></td> <td style="text-align: center; padding: 5px;">911</td> </tr> <tr> <td style="padding: 5px;">State Police</td> <td></td> <td style="text-align: center; padding: 5px;">911</td> </tr> <tr> <td style="padding: 5px;">Health Department</td> <td></td> <td></td> </tr> <tr> <td style="padding: 5px;">Poison Control Center</td> <td></td> <td style="text-align: center; padding: 5px;">800-848-6946</td> </tr> <tr> <td style="padding: 5px;">Occupational Physician</td> <td style="padding: 5px;">Dr. Jerry Berke,</td> <td style="text-align: center; padding: 5px;">800-350-4511</td> </tr> <tr> <td></td> <td style="padding: 5px;">Health Resources</td> <td></td> </tr> </tbody> </table>			EMERGENCY CONTACTS	NAME	PHONE	Health and Safety Manager	Bill Fink	414-234-7845	Project Manager	Raghu Nagam	312-217-7003	Site Safety Coordinator	Naren Babu	312-656-7685	Client Contact (EPA OSC)	Nuria Muniz	312-886-4439	Other			State Agency			State Spill Number			Fire Department		911	Police Department		911	State Police		911	Health Department			Poison Control Center		800-848-6946	Occupational Physician	Dr. Jerry Berke,	800-350-4511		Health Resources	
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<b>CONTINGENCY PLANS:</b> <i>Summarize below</i> Exit Area and contact Program Manger Raghu Nagam (312-217-7003), or corporate Health and Saftey Officer William Fink (414-234-7845). Continuously follow the "buddy system". Determine roles and responsibilities prior to going on site. Go over the emergency exiting the hot-zone. Have a planned task and know the signs and symptoms of exposure. Follow the proper OTIE Safety and Health SOPs and protocols. Make sure if 2 personnel are in level C, you have the proper backup personnel. DO NOT Enter any confined space without training and making arrangements and approvals (Permits) prior to conducting that type of activiy. For additional assistance and information please contact Elisa Walker(312) 296-9186. Buddy system will be maintained at all times.			<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left; padding: 5px;">MEDICAL EMERGENCY</th> <th style="text-align: left; padding: 5px;">PHONE</th> </tr> </thead> <tbody> <tr> <td style="padding: 5px;">Hospital Name:</td> <td style="padding: 5px;">Bell Hospital                      906-486-4431</td> </tr> <tr> <td style="padding: 5px;">Hospital Address</td> <td style="padding: 5px;">901 Lakeshore Drive, Ishpeming, MI</td> </tr> <tr> <td style="padding: 5px;">Name of Contact at Hospital:</td> <td></td> </tr> <tr> <td style="padding: 5px;">Name of 24-Hour Ambulance:</td> <td style="text-align: center; padding: 5px;">911</td> </tr> <tr> <td style="padding: 5px;">Route to Hospital:</td> <td style="padding: 5px;">(see attached sheet)</td> </tr> <tr> <td style="padding: 5px;">Distance to Hospital</td> <td style="padding: 5px;">13.6 miles</td> </tr> </tbody> </table>			MEDICAL EMERGENCY	PHONE	Hospital Name:	Bell Hospital                      906-486-4431	Hospital Address	901 Lakeshore Drive, Ishpeming, MI	Name of Contact at Hospital:		Name of 24-Hour Ambulance:	911	Route to Hospital:	(see attached sheet)	Distance to Hospital	13.6 miles																															
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<b>HEALTH AND SAFETY PLAN APPROVALS</b>  Prepared by <u>Naren Babu</u> Date <u>10/21/2011</u> DHSC Signature      _____                      Date _____ HSM Signature      _____                      Date _____																																																		

## HEALTH AND SAFETY PLAN SIGNATURE FORM

### OTIE Health and Safety Program

All site personnel must sign this form indicating receipt of the H&SP. Keep this original on site. It becomes part of the permanent project files. Send a copy to the Health and Safety Manager (HSM).

**SITE NAME/NUMBER:** Humboldt Mill Site / 2010101-2001

**DIVISION/LOCATION:** OTIE- Chicago, IL

**DATE:** October 11, 2011

I understand, and agree to comply with, the provisions of the above referenced H&SP for work activities on this project. I agree to report any injuries, illnesses or exposure incidents to the site Health and Safety Coordinator (SHSC). I agree to inform the SHSC about any drugs (legal and illegal) that I take within three days of site work.

PRINTED NAME	SIGNATURE	DATE



**HEALTH AND SAFETY PLAN FORM**

*This document is for the exclusive use of TN&Associates  
its subcontractors, and EPA*

**TN & ASSOCIATES****TN & Associates Health and Safety Program****Site Name:****DECONTAMINATION PROCEDURES****ATTACH SITE MAP INDICATING EXCLUSION, DECONTAMINATION, AND SUPPORT ZONES****Maximum Measures for Level A Decontamination**

Station 1	Segregated Equipment Drop	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up in this area.	Station 17	Inner Clothing Removal	17. Remove inner clothing. Place in container with plastic liner. Do not wear inner clothing off-site since there is a possibility that small amounts of contaminants might have been transferred in removing the fully-encapsulated suit.
Station 2	Boot Cover / Glove Wash	2. Scrub outer boot covers and gloves with decon solution or detergent and water.	Station 18	Field Wash	18. Shower if highly toxic, skin corrosive or skin absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.
Station 3	Boot Cover / Glove Rinse	3. Rinse off decon solution from station 2 using copious amounts of water.			
Station 4	Tape Removal	4. Remove tape around boots and gloves and deposit in container with plastic liner.	Station 19	Redress	19. Put on clean clothes.
Station 5	Boot Cover Removal	5. Remove boot covers and deposit in container with plastic liner.	<b>Minimum Measures for Level A Decontamination</b>		
Station 6	Outer Glove Removal	6. Remove outer gloves and deposit in container with plastic liner.	Station 1	Equipment Drop	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up in this area.
Station 7	Suit and Boot Wash	7. Wash encapsulating suit and boots using scrub brush and decon solution and detergent/water. Repeat as many times as necessary.	Station 2	OG, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and fully-encapsulating suit with decon solution or detergent water. Rinse off using copious amounts of water.
Station 8	Suit and Boot	8. Rinse off decon solution using copious amounts of water. Repeat as many times as necessary.			
Station 9	Tank Change	9. If an air tank change is desired, this is the last step of the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boot covers donned and joints taped. Worker returns to duty.	Station 3	OB and Glove Removal	3. Removal outer boots and gloves. Deposit in container with plastic liner.
Station 10	Safety Boot Removal	10. Remove safety boots and deposit in container with plastic liner.	Station 4	Tank Change	4. If worker leaves exclusion zone to change air tank, this is the last step of the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boot covers donned and joints taped. Worker returns to duty.
Station 11	Fully Encapsulating Suit and Hard Hat Removal	11. Fully encapsulated suit is removed with assistance of a helper and laid out on a drop cloth or hung up. Hard hat is removed. Hot weather rest station may be set up within this area for personnel returning to the site.	Station 5	Boot, Gloves, and OG Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in container with plastic liner.
Station 12	SCBA Backpack Removal	12. While still wearing facepiece, remove backpack and place on table. Disconnect hose from regulator valve and proceed to next station.	Station 6	SCBA Removal	6. SCBA backpack and face piece is removed. Avoid touching face with fingers. SCBA is deposited on plastic sheets.
Station 13	Inner Glove Wash	13. Wash with decon solution that will not harm the skin. Repeat as many times as necessary.	Station 7	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.
Station 14	Inner Glove Rinse	14. Rinse inner gloves with water. Repeat as many times as necessary.	OG = Outer Garment      OB = Outer Boot  Decontamination Appendix Page 1 of 4		
Station 15	Face Piece Removal	15. Remove face piece. Deposit in container with plastic liner. Avoid touching face with fingers.			
Station 16	Inner Glove Removal	16. Remove inner gloves and deposit in container with plastic liner.			

### Maximum Measures for Level B Decontamination

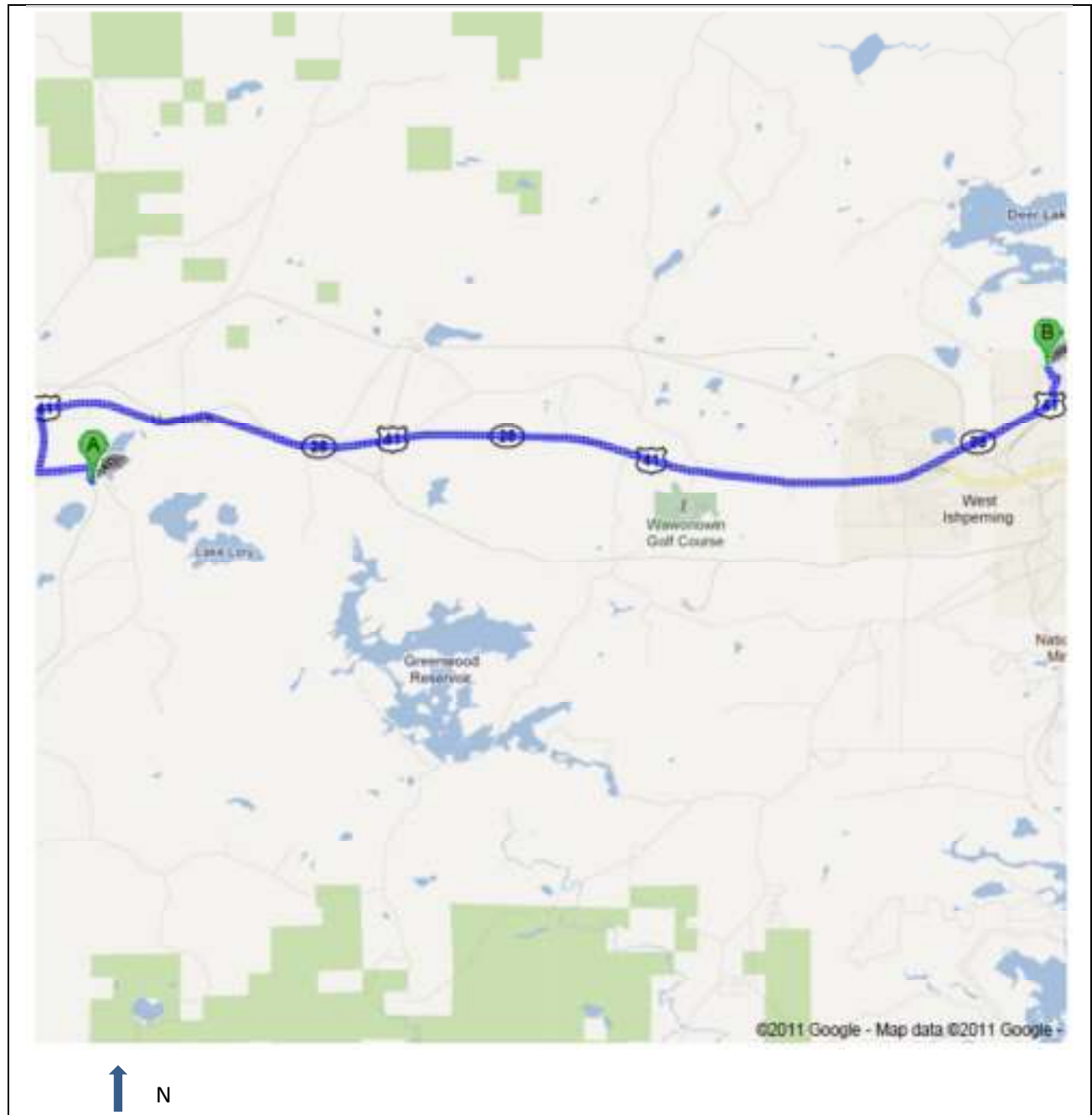
Station 1	Segregated Equipment Drop	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up in this area.	Station 18	Field Wash	18. Shower if highly toxic, skin corrosive or skin absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.
Station 2	Boot Cover / Glove Wash	2. Scrub outer boot covers and gloves with decon solution or detergent and water.	Station 19	Redress	19. Put on clean clothes.
Station 3	Boot Cover / Glove Rinse	3. Rinse off decon solution from station 2 using copious amounts of water.	<b>Minimum Measures for Level B Decontamination</b>		
Station 4	Tape Removal	4. Remove tape around boots and gloves and deposit in container with plastic liner.			
Station 5	Boot Cover Removal	5. Remove boot covers and deposit in container with plastic liner.	Station 1	Equipment Drop	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up in this area.
Station 6	Outer Glove Removal	6. Remove outer gloves and deposit in container with plastic liner.	Station 2	OG, Boots, Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical resistant splash suit with decon solution or detergent water. Rinse off using copious amounts of water.
Station 7	Suit and Safety Boot Wash	7. Wash chemical resistant splash suit, SCBA, gloves and safety boots. Scrub with long handle scrub brush and decon solution. Wrap SCBA regulator (if belt mounted type) with plastic to keep out of water. Wash back pack assembly with sponges or cloth.	Station 3	Outer Boot and Glove Removal	3. Removal outer boots and gloves. Deposit in container with plastic liner.
Station 8	Suit, SCBA, Boot and Glove Rinse	8. Rinse off decon solution using copious amounts of water.	Station 4	Tank Change	4. If worker leaves exclusion zone to change air tank, this is the last step of the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boot covers donned and joints taped. Worker returns to duty.
Station 9	Tank Change	9. If worker leaves exclusion zone to change air tank, this is the last step of the decontamination procedure. Worker's air tank is exchanged, new outer gloves and boot covers donned and joints taped. Worker returns to duty.	Station 5	Boot, Gloves and OG Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in container with plastic liner.
Station 10	Safety Boot Removal	10. Remove safety boots and deposit in container with plastic liner.	Station 6	SCBA Removal	6. SCBA backpack and face piece is removed. Avoid touching face with fingers. SCBA is deposited on plastic sheets.
Station 11	SCBA Backpack Removal	11. While still wearing face piece, remove backpack and place on table. Disconnect hose from regulator valve.	Station 7	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.
Station 12	Splash Suit Removal	12. With assistance of helper, remove splash suit. Deposit in container with plastic liner.	OG = Outer Garment    Decontamination Appendix Page 2 of 4		
Station 13	Inner Glove Wash	13. Wash inner gloves with decon solution.			
Station 14	Inner Glove Rinse	14. Rinse inner gloves with water.			
Station 15	Face Piece Removal	15. Remove face piece. Deposit in container with plastic liner. Avoid touching face with fingers.			
Station 16	Inner Glove Removal	16. Remove inner gloves and deposit in container with plastic liner.			
Station 17	Inner Clothing Removal	17. Remove inner clothing. Place in container with plastic liner. Do not wear inner clothing off-site since there is a possibility that small amounts of contaminants might have been transferred in removing the fully-encapsulated suit.			

Maximum Measures for Level C Decontamination			Minimum Measures for Level C Decontamination		
Station 1	Segregated Equipment Drop	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up in this area.	Station 1	Equipment Drop	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up in this area.
Station 2	Boot Cover / Glove Wash	2. Scrub outer boot covers and gloves with decon solution or detergent and water.	Station 2	OG, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical resistant splash suit with decon solution or detergent water. Rinse off using copious amounts of water.
Station 3	Boot Cover / Glove Rinse	3. Rinse off decon solution from station 2 using copious amounts of water.			
Station 4	Tape Removal	4. Remove tape around boots and gloves and deposit in container with plastic liner.	Station 3	OB and Glove Removal	3. Removal outer boots and gloves. Deposit in container with plastic liner.
Station 5	Boot Cover Removal	5. Remove boot covers and deposit in container with plastic liner.	Station 4	Canister or Mask Change	4. If worker leaves exclusion zone to change canister (or mask), this is the last step of the decontamination procedure. Worker's canister (or mask) is exchanged, new outer gloves and boot covers donned and joints taped. Worker returns to duty.
Station 6	Outer Glove Removal	6. Remove outer gloves and deposit in container with plastic liner.			
Station 7	Suit and Boot Wash	7. Wash splash suit, gloves and safety boots. Scrub with long handle scrub brush and decon solution.			
Station 8	Suit, Boot and Glove Rinse	8. Rinse off decon solution using copious amounts of water.	Station 5	Boot, Gloves and OG	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in container with plastic liner.
Station 9	Canister or Mask Change	9. If worker leaves exclusion zone to change canister (or mask), this is the last step of the decontamination procedure. Worker's canister (or mask) is exchanged, new outer gloves and boot covers donned and joints taped. Worker returns to duty.	Station 6	Face Piece Removal	6. Face piece is removed. Avoid touching face with fingers. Face piece is deposited on plastic sheet.
Station 10	Safety Boot Removal	10. Remove safety boots and deposit in container with plastic liner.	Station 7	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.
Station 11	Splash Suit Removal	11. With assistance of helper, remove splash suit. Deposit in container with plastic liner.	OG = Outer Garment      OB = Outer Boot		
Station 12	Inner Glove Wash	12. Wash inner gloves with decon solution.			
Station 13	Inner Glove Rinse	13. Rinse inner gloves with water.			
Station 14	Face Piece Removal	14. Remove face piece. Deposit in container with plastic liner. Avoid touching face with fingers.			
Station 15	Inner Glove Removal	15. Remove inner gloves and deposit in container with plastic liner.			
Station 16	Inner Clothing Removal	16. Remove inner clothing soaked with perspiration and place in container with plastic liner. Do not wear inner clothing off-site since there is a possibility that small amounts of contaminants might have been transferred in removing the fully-encapsulated suit.			
Station 17	Field Wash	17. Shower if highly toxic, skin corrosive or skin absorbable materials are known or suspected to be present. Wash hands and face if shower is not available.			
Station 18	Redress	18. Put on clean clothes.			

Minimum Measures for Level D Decontamination			Containment and Disposal Method
Station 1	Equipment Drop	1. Deposit equipment used on site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths or in different containers with plastic liners. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up in this area.	The decontamination rinsate will be collected, packaged in drums and temporarily stored at the site. After analytical results are available, the waste will be profiled and transported under appropriate documentation for disposal in accordance with applicable law and regulations. The PPE will be collected and bagged for disposal as a solid waste. If spills should occur, prompt cleanup with dedicated equipment from onsite spill response inventory will be used.
Station 2	OG, Boots, Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical resistant splash suit with decon solution or detergent water. Rinse off using copious amounts of water.	
Station 3	OB and Glove Removal	3. Removal outer boots and gloves. Deposit in container with plastic liner.	
Station 4	Boot, Gloves, OG Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in container with plastic liner.	<p><b>Medical Emergency Decontamination Procedures</b></p> <p>The following procedures are to be used for providing emergency medical treatment to personnel sustaining injury while working in the exclusion area of the site. The procedures are to be used by site/safety personnel, emergency medical staff/ambulance crewmembers, and hospital emergency room staff ONLY when the nature of the medical emergency supersedes SOPs for chemical decontamination when exiting the exclusion area. Although specific contaminants, by nature, must be dealt with on a case-by-case basis, the following procedures generally will be followed.</p> <p><b>Injury Involving Potential for Contact with Contaminated Clothing and Skin</b></p> <p>An initial assessment of the injured person will be performed first, to determine if the employee has suffered a spinal/head injury. Potential spinal/head injuries may require some PPE to be left on the injured employee. However, emergency decontamination procedures must be used to remove as much potential contamination as possible. If the initial assessment does not provide evidence of a spinal/head injury, all protective clothing (hard hat, outer boots, and gloves) will be removed by personnel at the site before the injured person is transferred to an ambulance. This can be performed anywhere on the site although when at all possible, it should be performed in the CRZ. Contaminated protective clothing must be cut off to prevent cross contamination. Emergency clothing removal and decontamination of potentially contaminated skin expedites decontamination of the injured person in the CRZ and prevents contamination of emergency vehicles, emergency staff, and emergency room facilities. Pre-surgery preparation for the injured person would consist of normal soap and water rinsing and is conducted by EMS personnel</p>
Station 5	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.	
OG = Outer Garment      OB = Outer Boot			
Sampling Equipment Decontamination			
<p>All equipment will be cleaned prior to entering the Site.</p> <p>Equipment will be tripled rinse consisting of non-phosphate detergent and tap water solution, rinse with potable water, and rinse with de-ionized water. If soap and water alone cannot remove contamination, additional procedures may be used such as steam cleaning.</p>			
Heavy Equipment Decontamination			
<p>All equipment will be cleaned prior to entering the Site.</p> <p>All vehicles and heavy equipment used in the EZ will be decontaminated in the CRZ and inspected prior to leaving the site. A Certification of Decontamination form will be included in the daily safety log. All vehicles and equipment will be decontaminated according to the procedures described below:</p> <p>Vehicles and heavy equipment contaminated with Contaminates of Concern (COCs) from the site excavation activities will be placed on a decontamination pad and sprayed down with a pressure washer. This pad will be constructed as a bermed liner and equipped with a pump and suitable container for waste water generated from the equipment decontamination process. Soils and fines that cannot be pumped will be shoveled from the liner following spraying down of vehicles and equipment and transported to appropriate soil stockpiles on-site.</p> <p>Personnel engaged in decontamination will be in a rain suit, hardhat equipped with a face shield, with shin guards to protect from the blast and overspray of the pressure washer used for heavy equipment decontamination.</p>			

**HOSPITAL ROUTE MAP**  
**HUMBOLDT MILL SITE**  
4547 County Road, Champion, Michigan  
**TO**  
**Bell Hospital**  
901 Lakeshore Drive, Ishpeming, Michigan  
Phone: 906-486-4431

13.6 miles – about 18 mins





4547 County Road 601, Champion, MI 49814

1. Head **northwest** on **Co Rd 601** toward **M-95 S**  
About 2 mins

go 0.7 mi  
total 0.7 mi



2. Turn right onto **M-95 N**  
About 1 min

go 0.7 mi  
total 1.4 mi



3. Turn right onto **M-28 E/US-41 S**  
About 13 mins

go 11.7 mi  
total 13.1 mi



4. Turn left onto **N Lakeshore**  
About 2 mins

go 0.3 mi  
total 13.4 mi



5. Turn left onto **Franson Rd/Old Farm Rd**  
Continue to follow Old Farm Rd  
Destination will be on the right

go 0.2 mi  
total 13.6 mi



901 Lakeshore Drive, Ishpeming, MI



10/25/2011

MEMORANDUM

SUBJECT: Addendum to HASP, Humboldt Mill SI, Humboldt, Marquette County, MI

FROM: Naren Babu  
OTIE, Staff Engineer

TO: Nuria Muniz  
NPL Coordinator, Region 5 U.S. EPA Superfund Division

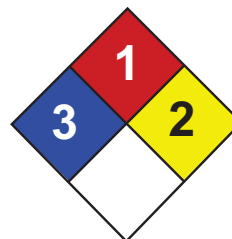
OTIE is submitting this document as an "addendum" to the HASP generated for the Humboldt Mill SI Sampling activities.

- OTIE staff will go through proper training, provided by OTIE prior to arriving at the site and by KEL on-site upon arrival at the site.
- OTIE staff will be escorted by the KEL staff at all times and follow KEL's directions when on-site.
- OTIE staff will don appropriate PPE, such as, steel toe shoes, hard hats, high visibility vests, eye protection glasses and leather gloves at all times at the site. Hearing protection will be determined based on working areas and equipment on-site.
- OTIE staff will follow the signs and directions posted on-site and drive/walk only on designated areas.
- While working near areas where heavy equipment traffic is anticipated, OTIE staff will maintain eye contact with the operator of the heavy equipment and move around only when signaled by the operator.
- Non-dedicated sampling tools such as hand augers, spoons will be decontaminated after each sample is collected. The decontamination will be conducted in the CRZ. CRZ will comprise of visqueen laid on the floor and will include buckets with decontamination fluids (dilute nitric acid, hexane solution, andalconox solution) and distilled water. Each piece of sampling equipment will be decontaminated using above mentioned solutions prior to their reuse. The decontaminated solution will be collected in a separate container (bucket, etc.) for later disposal.

## **ATTACHMENT A**

### **Material Safety Data Sheets**





Health	3
Fire	1
Reactivity	2
Personal Protection	E

## Material Safety Data Sheet

### Arsenic MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Arsenic

**Catalog Codes:** SLA1006

**CAS#:** 7440-38-2

**RTECS:** CG0525000

**TSCA:** TSCA 8(b) inventory: Arsenic

**CI#:** Not applicable.

**Synonym:**

**Chemical Name:** Arsenic

**Chemical Formula:** As

#### Contact Information:

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

##### Composition:

Name	CAS #	% by Weight
Arsenic	7440-38-2	100

**Toxicological Data on Ingredients:** Arsenic: ORAL (LD50): Acute: 763 mg/kg [Rat]. 145 mg/kg [Mouse].

#### Section 3: Hazards Identification

##### Potential Acute Health Effects:

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant), of eye contact (irritant).

##### Potential Chronic Health Effects:

**CARCINOGENIC EFFECTS:** Classified A1 (Confirmed for human.) by ACGIH. **MUTAGENIC EFFECTS:** Not available.

**TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance is toxic to kidneys, lungs, the nervous system, mucous membranes. Repeated or prolonged exposure to the substance can produce target organs damage.

#### Section 4: First Aid Measures

##### Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Flammable in presence of open flames and sparks, of heat, of oxidizing materials.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:**

Material in powder form, capable of creating a dust explosion. When heated to decomposition it emits highly toxic fumes.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:** Use appropriate tools to put the spilled solid in a convenient waste disposal container.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents, acids, moisture.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 0.01 from ACGIH (TLV) [United States] [1995] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Lustrous solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 74.92 g/mole

**Color:** Silvery.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** Not available.

**Melting Point:** Sublimation temperature: 615°C (1139°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 5.72 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water, hot water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Reactive with oxidizing agents, acids, moisture.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 145 mg/kg [Mouse].

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH. Causes damage to the following organs: kidneys, lungs, the nervous system, mucous membranes.

**Other Toxic Effects on Humans:**

Very hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are as toxic as the original product.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** CLASS 6.1: Poisonous material.

**Identification:** : Arsenic UNNA: UN1558 PG: II

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Arsenic California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Arsenic Pennsylvania RTK: Arsenic Massachusetts RTK: Arsenic TSCA 8(b) inventory: Arsenic

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:****WHMIS (Canada):**

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R22- Harmful if swallowed. R45- May cause cancer.

**HMIS (U.S.A.):**

**Health Hazard:** 3

**Fire Hazard:** 1

**Reactivity:** 2

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 3

**Flammability:** 1

**Reactivity:** 2

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

**Section 16: Other Information****References:**

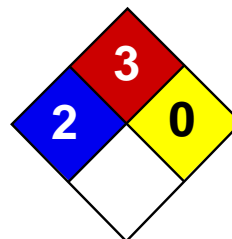
-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -Liste des produits purs tératogènes, mutagènes, cancérrogènes. Répertoire toxicologique de la Commission de la Santé et de la Sécurité du Travail du Québec. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -SAX, N.I. Dangerous Properties of Industrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. -Guide de la loi et du règlement sur le transport des marchandises dangereuses au Canada. Centre de conformité international Ltée. 1986.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 04:16 PM

**Last Updated:** 11/01/2010 12:00 PM

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

## Material Safety Data Sheet

### Benzene MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Benzene

**Catalog Codes:** SLB1564, SLB3055, SLB2881

**CAS#:** 71-43-2

**RTECS:** CY1400000

**TSCA:** TSCA 8(b) inventory: Benzene

**CI#:** Not available.

**Synonym:** Benzol; Benzine

**Chemical Name:** Benzene

**Chemical Formula:** C<sub>6</sub>H<sub>6</sub>

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Benzene	71-43-2	100

**Toxicological Data on Ingredients:** Benzene: ORAL (LD50): Acute: 930 mg/kg [Rat]. 4700 mg/kg [Mouse]. DERMAL (LD50): Acute: >9400 mg/kg [Rabbit]. VAPOR (LC50): Acute: 10000 ppm 7 hours [Rat].

#### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Very hazardous in case of eye contact (irritant), of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion. Inflammation of the eye is characterized by redness, watering, and itching.

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. MUTAGENIC EFFECTS: Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Reproductive system/toxin/female [POSSIBLE]. The substance is toxic to blood, bone marrow, central nervous system (CNS). The substance may be toxic to liver, Urinary System. Repeated or prolonged exposure to the substance can produce target organs damage.

#### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 497.78°C (928°F)

**Flash Points:** CLOSED CUP: -11.1°C (12°F). (Setaflash)

**Flammable Limits:** LOWER: 1.2% UPPER: 7.8%

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>).

**Fire Hazards in Presence of Various Substances:**

Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials. Non-flammable in presence of shocks.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Explosive in presence of oxidizing materials, of acids.

**Fire Fighting Media and Instructions:**

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

**Special Remarks on Fire Hazards:**

Extremely flammable liquid and vapor. Vapor may cause flash fire. Reacts on contact with iodine heptafluoride gas. Dioxygenyl tetrafluoroborate is as very powerful oxidant. The addition of a small particle to small samples of benzene, at ambient temperature, causes ignition. Contact with sodium peroxide with benzene causes ignition. Benzene ignites in contact with powdered chromic anhydride. Virgorous or incandescent reaction with hydrogen + Raney nickel (above 210 C) and bromine trifluoride.

**Special Remarks on Explosion Hazards:**

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction

of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid ( or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids.

**Storage:**

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

TWA: 0.5 STEL: 2.5 (ppm) from ACGIH (TLV) [United States] TWA: 1.6 STEL: 8 (mg/m3) from ACGIH (TLV) [United States] TWA: 0.1 STEL: 1 from NIOSH TWA: 1 STEL: 5 (ppm) from OSHA (PEL) [United States] TWA: 10 (ppm) from OSHA (PEL) [United States] TWA: 3 (ppm) [United Kingdom (UK)] TWA: 1.6 (mg/m3) [United Kingdom (UK)] TWA: 1 (ppm) [Canada] TWA: 3.2 (mg/m3) [Canada] TWA: 0.5 (ppm) [Canada] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odor:**

Aromatic. Gasoline-like, rather pleasant. (Strong.)

**Taste:** Not available.

**Molecular Weight:** 78.11 g/mole



**Color:** Clear Colorless. Colorless to light yellow.

**pH (1% soln/water):** Not available.

**Boiling Point:** 80.1 (176.2°F)

**Melting Point:** 5.5°C (41.9°F)

**Critical Temperature:** 288.9°C (552°F)

**Specific Gravity:** 0.8787 @ 15 C (Water = 1)

**Vapor Pressure:** 10 kPa (@ 20°C)

**Vapor Density:** 2.8 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 4.68 ppm

**Water/Oil Dist. Coeff.:** The product is more soluble in oil;  $\log(\text{oil/water}) = 2.1$

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, diethyl ether, acetone.

**Solubility:**

Miscible in alcohol, chloroform, carbon disulfide oils, carbon tetrachloride, glacial acetic acid, diethyl ether, acetone. Very slightly soluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Heat, ignition sources, incompatibles.

**Incompatibility with various substances:** Highly reactive with oxidizing agents, acids.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**

Benzene vapors + chlorine and light causes explosion. Reacts explosively with bromine pentafluoride, chlorine, chlorine trifluoride, diborane, nitric acid, nitryl perchlorate, liquid oxygen, ozone, silver perchlorate. Benzene + pentafluoride and methoxide (from arsenic pentafluoride and potassium methoxide) in trichlorotrifluoroethane causes explosion. Interaction of nitryl perchlorate with benzene gave a slight explosion and flash. The solution of permanganic acid ( or its explosive anhydride, dimanganese heptoxide) produced by interaction of permanganates and sulfuric acid will explode on contact with benzene. Peroxodisulfuric acid is a very powerful oxidant. Uncontrolled contact with benzene may cause explosion. Mixtures of peroxomonsulfuric acid with benzene explodes.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation.

**Toxicity to Animals:**

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 930 mg/kg [Rat]. Acute dermal toxicity (LD50): >9400 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 10000 7 hours [Rat].

**Chronic Effects on Humans:**

**CARCINOGENIC EFFECTS:** Classified A1 (Confirmed for human.) by ACGIH, 1 (Proven for human.) by IARC. **MUTAGENIC EFFECTS:** Classified POSSIBLE for human. Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. **DEVELOPMENTAL TOXICITY:** Classified Reproductive system/toxin/female [POSSIBLE]. Causes damage to the following organs: blood, bone marrow, central nervous system (CNS). May cause damage to the following organs: liver, Urinary System.

**Other Toxic Effects on Humans:**

Very hazardous in case of inhalation. Hazardous in case of skin contact (irritant, permeator), of ingestion.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:**

May cause adverse reproductive effects (female fertility, Embryotoxic and/or foetotoxic in animal) and birth defects. May affect genetic material (mutagenic). May cause cancer (tumorigenic, leukemia)) Human: passes the placental barrier, detected in maternal milk.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects: Skin: Causes skin irritation. It can be absorbed through intact skin and affect the liver, blood, metabolism, and urinary system. Eyes: Causes eye irritation. Inhalation: Causes respiratory tract and mucous membrane irritation. Can be absorbed through the lungs. May affect behavior/Central and Peripheral nervous systems (somnolence, muscle weakness, general anesthetic, and other symptoms similar to ingestion), gastrointestinal tract (nausea), blood metabolism, urinary system. Ingestion: May be harmful if swallowed. May cause gastrointestinal tract irritation including vomiting. May affect behavior/Central and Peripheral nervous systems (convulsions, seizures, tremor, irritability, initial CNS stimulation followed by depression, loss of coordination, dizziness, headache, weakness, pallor, flushing), respiration (breathlessness and chest constriction), cardiovascular system, (shallow/rapid pulse), and blood.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** CLASS 3: Flammable liquid.

**Identification:** : Benzene UNNA: 1114 PG: II

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Benzene California prop. 65 (no significant risk level): Benzene: 0.007 mg/day (value) California prop. 65: This product contains the following ingredients

for which the State of California has found to cause cancer which would require a warning under the statute: Benzene Connecticut carcinogen reporting list.: Benzene Connecticut hazardous material survey.: Benzene Illinois toxic substances disclosure to employee act: Benzene Illinois chemical safety act: Benzene New York release reporting list: Benzene Rhode Island RTK hazardous substances: Benzene Pennsylvania RTK: Benzene Minnesota: Benzene Michigan critical material: Benzene Massachusetts RTK: Benzene Massachusetts spill list: Benzene New Jersey: Benzene New Jersey spill list: Benzene Louisiana spill reporting: Benzene California Director's list of Hazardous Substances: Benzene TSCA 8(b) inventory: Benzene SARA 313 toxic chemical notification and release reporting: Benzene CERCLA: Hazardous substances.: Benzene: 10 lbs. (4.536 kg)

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R11- Highly flammable. R22- Harmful if swallowed. R38- Irritating to skin. R41- Risk of serious damage to eyes. R45- May cause cancer. R62- Possible risk of impaired fertility. S2- Keep out of the reach of children. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S46- If swallowed, seek medical advice immediately and show this container or label. S53- Avoid exposure - obtain special instructions before use.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 3

**Reactivity:** 0

**Personal Protection:** h

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 3

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

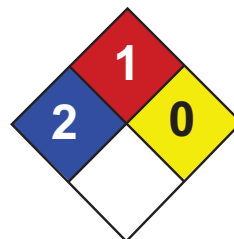
**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:35 PM

**Last Updated:** 11/01/2010 12:00 PM

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Health	2
Fire	1
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet

### Chromium MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Chromium

**Catalog Codes:** SLC4711, SLC3709

**CAS#:** 7440-47-3

**RTECS:** GB4200000

**TSCA:** TSCA 8(b) inventory: Chromium

**CI#:** Not applicable.

**Synonym:** Chromium metal; Chrome; Chromium Metal Chips 2" and finer

**Chemical Name:** Chromium

**Chemical Formula:** Cr

#### Contact Information:

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

##### Composition:

Name	CAS #	% by Weight
Chromium	7440-47-3	100

**Toxicological Data on Ingredients:** Chromium LD50: Not available. LC50: Not available.

#### Section 3: Hazards Identification

##### Potential Acute Health Effects:

Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

##### Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC.

MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to kidneys, lungs, liver, upper respiratory tract. Repeated or prolonged exposure to the substance can produce target organs damage.

#### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** 580°C (1076°F)

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:**

Slightly flammable to flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:**

Moderate fire hazard when it is in the form of a dust (powder) and burns rapidly when heated in flame. Chromium is attacked vigorously by fused potassium chlorate producing vivid incandescence. Pyrophoric chromium unites with nitric oxide with incandescence. Incandescent reaction with nitrogen oxide or sulfur dioxide.

**Special Remarks on Explosion Hazards:**

Powdered Chromium metal +fused ammonium nitrate may react violently or explosively. Powdered Chromium will explode spontaneously in air.

## Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

### Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

### Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 0.5 (mg/m<sup>3</sup>) from ACGIH (TLV) [United States] TWA: 1 (mg/m<sup>3</sup>) from OSHA (PEL) [United States] TWA: 0.5 (mg/m<sup>3</sup>) from NIOSH [United States] TWA: 0.5 (mg/m<sup>3</sup>) [United Kingdom (UK)] TWA: 0.5 (mg/m<sup>3</sup>) [Canada] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Metal solid.)

**Odor:** Odorless.

**Taste:** Not available.

**Molecular Weight:** 52 g/mole

**Color:** Silver-white to Grey.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 2642°C (4787.6°F)

**Melting Point:** 1900°C (3452°F) +/- 10 deg. C

**Critical Temperature:** Not available.

**Specific Gravity:** 7.14 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:**

Insoluble in cold water, hot water. Soluble in acids (except Nitric), and strong alkalies.

### Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Excess heat, incompatible materials

**Incompatibility with various substances:** Reactive with oxidizing agents, acids, alkalis.

**Corrosivity:** Not available.

**Special Remarks on Reactivity:**

Incompatible with molten Lithium at 180 deg. C, hydrogen peroxide, hydrochloric acid, sulfuric acid, most caustic alkalies and alkali carbonates, potassium chlorate, sulfur dioxide, nitrogen oxide, bromine pentafluoride. It may react violently or ignite with bromine pentafluoride. Chromium is rapidly attacked by fused sodium hydroxide + potassium nitrate. Potentially hazardous incompatibility with strong oxidizers.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

### Section 11: Toxicological Information

**Routes of Entry:** Inhalation. Ingestion.

**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: kidneys, lungs, liver, upper respiratory tract.

**Other Toxic Effects on Humans:**

Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of ingestion.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:**

May cause cancer based on animal data. There is no evidence that exposure to trivalent chromium causes cancer in man.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects: May cause skin irritation. Eyes: May cause mechanical eye irritation. Inhalation: May cause irritation of the respiratory tract and mucous membranes of the respiratory tract. Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea. Chronic Potential Health Effects: Inhalation: The effects of chronic exposure include irritation, sneezing, redness of the throat, bronchospasm, asthma, cough, polyps, chronic inflammation, emphysema, chronic bronchitis, pharyngitis, bronchopneumonia, pneumoconiosis. Effects on the nose from chronic chromium exposure include irritation, ulceration, and perforation of the nasal septum. Inflammation and ulceration of the larynx may also occur. Ingestion or Inhalation: Chronic exposure may cause liver and kidney damage.

### Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The product itself and its products of degradation are not toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

**Section 13: Disposal Considerations****Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

**Section 14: Transport Information**

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

**Section 15: Other Regulatory Information****Federal and State Regulations:**

Connecticut hazardous material survey.: Chromium Illinois toxic substances disclosure to employee act: Chromium Illinois chemical safety act: Chromium New York release reporting list: Chromium Rhode Island RTK hazardous substances: Chromium Pennsylvania RTK: Chromium Minnesota: Chromium Michigan critical material: Chromium Massachusetts RTK: Chromium Massachusetts spill list: Chromium New Jersey: Chromium New Jersey spill list: Chromium Louisiana spill reporting: Chromium California Director's List of Hazardous Substances: Chromium TSCA 8(b) inventory: Chromium SARA 313 toxic chemical notification and release reporting: Chromium CERCLA: Hazardous substances.: Chromium: 5000 lbs. (2268 kg)

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** Not controlled under WHMIS (Canada).

**DSCL (EEC):**

R40- Limited evidence of carcinogenic effect S36/37/39- Wear suitable protective clothing, gloves and eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**



**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Splash goggles.

**Section 16: Other Information**

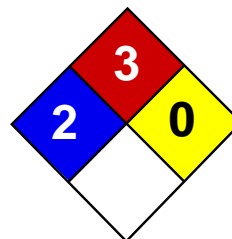
**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:16 PM

**Last Updated:** 11/01/2010 12:00 PM

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

## Material Safety Data Sheet

### Ethylbenzene MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Ethylbenzene

**Catalog Codes:** SLE2044

**CAS#:** 100-41-4

**RTECS:** DA0700000

**TSCA:** TSCA 8(b) inventory: Ethylbenzene

**CI#:** Not available.

**Synonym:** Ethyl Benzene; Ethylbenzol; Phenylethane

**Chemical Name:** Ethylbenzene

**Chemical Formula:** C<sub>8</sub>H<sub>10</sub>

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Ethylbenzene	100-41-4	100

**Toxicological Data on Ingredients:** Ethylbenzene: ORAL (LD50): Acute: 3500 mg/kg [Rat].

#### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

**Potential Chronic Health Effects:**

Slightly hazardous in case of skin contact (irritant, sensitizer). CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

#### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 432°C (809.6°F)

**Flash Points:**

CLOSED CUP: 15°C (59°F). (Tagliabue.) OPEN CUP: 26.667°C (80°F) (Cleveland) (CHRIS, 2001) CLOSED CUP: 12.8 C (55 F) (Bingham et al, 2001; NIOSH, 2001) CLOSED CUP: 21 C (70 F) (NFPA)

**Flammable Limits:** LOWER: 0.8% - 1.6%UPPER: 6.7% - 7%

**Products of Combustion:** These products are carbon oxides (CO, CO2).

**Fire Hazards in Presence of Various Substances:** Highly flammable in presence of open flames and sparks, of heat.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available. Slightly explosive in presence of heat.

**Fire Fighting Media and Instructions:**

Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

**Special Remarks on Fire Hazards:**

Vapor may travel considerable distance to source of ignition and flash back. Vapors may form explosive mixtures with air. When heated to decomposition it emits acrid smoke and irritating fumes.

**Special Remarks on Explosion Hazards:** Vapors may form explosive mixtures in air.

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**

Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

### Precautions:

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

### Storage:

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Sensitive to light. Store in light-resistant containers.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

### Personal Protection:

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 100 STEL: 125 (ppm) from OSHA (PEL) [United States] TWA: 435 STEL: 545 from OSHA (PEL) [United States] TWA: 435 STEL: 545 (mg/m<sup>3</sup>) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from NIOSH [United States] TWA: 100 STEL: 125 (ppm) from ACGIH (TLV) [United States] TWA: 100 STEL: 125 (ppm) [United Kingdom (UK)] TWA: 100 STEL: 125 (ppm) [Belgium] TWA: 100 STEL: 125 (ppm) [Finland] TWA: 50 (ppm) [Norway] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid.

**Odor:** Sweetish. Gasoline-like. Aromatic.

**Taste:** Not available.

**Molecular Weight:** 106.16 g/mole

**Color:** Colorless.

**pH (1% soln/water):** Not available.

**Boiling Point:** 136°C (276.8°F)

**Melting Point:** -94.9 (-138.8°F)

**Critical Temperature:** 617.15°C (1142.9°F)

**Specific Gravity:** 0.867 (Water = 1)

**Vapor Pressure:** 0.9 kPa (@ 20°C)

**Vapor Density:** 3.66 (Air = 1)

**Volatility:** 100% (v/v).

**Odor Threshold:** 140 ppm

**Water/Oil Dist. Coeff.:** The product is more soluble in oil;  $\log(\text{oil/water}) = 3.1$

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, diethyl ether.

**Solubility:**

Easily soluble in diethyl ether. Very slightly soluble in cold water or practically insoluble in water. Soluble in all proportions in Ethyl alcohol. Soluble in Carbon tetrachloride, Benzene. Insoluble in Ammonia. Slightly soluble in Chloroform. Solubility in Water: 169 mg/l @ 25 deg. C.; 0.014 g/100 ml @ 15 deg. C.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Heat, ignition sources (flames, sparks, static), incompatible materials, light

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Not considered to be corrosive for metals and glass.

**Special Remarks on Reactivity:**

Can react vigorously with oxidizing materials. Sensitive to light.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Inhalation.

**Toxicity to Animals:** Acute oral toxicity (LD50): 3500 mg/kg [Rat].

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: Classified 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. May cause damage to the following organs: central nervous system (CNS).

**Other Toxic Effects on Humans:**

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant, permeator).

**Special Remarks on Toxicity to Animals:**

Lethal Dose/Conc 50% Kill: LD50 [Rabbit] - Route: Skin; Dose: 17800 ul/kg Lowest Published Lethal Dose/Conc: LDL[Rat] - Route: Inhalation (vapor); Dose: 4000 ppm/4 H

**Special Remarks on Chronic Effects on Humans:**

May cause adverse reproductive effects and birth defects (teratogenic) based on animal test data. May cause cancer based on animals data. IARC evidence for carcinogenicity in animals is sufficient. IARC evidence of carcinogenicity in humans inadequate. May affect genetic material (mutagenic).

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential Health Effects: Skin: Can cause mild skin irritation. It can be absorbed through intact skin. Eyes: Contact with vapor or liquid can cause severe eye irritation depending on concentration. It may also cause conjunctivitis. At a vapor exposure level of 85 - 200 ppm, it is mildly and transiently irritating to the eyes; 1000 ppm causes further irritation and tearing; 2000 ppm results in immediate and severe irritation and tearing; 5,000 ppm is intolerable (ACGIH, 1991; Clayton and Clayton, 1994). Standard draize test for eye irritation using 500 mg resulted in severe irritation (RTECS) Inhalation: Exposure to high concentrations can cause nasal, mucous membrane and respiratory tract irritation and can also result in chest constriction and, trouble breathing, respiratory failure, and even death. It can also affect behavior/Central Nervous System. The effective dose for CNS depression in experimental animals was 10,000 ppm (ACGIH, 1991). Symptoms of CNS depression include

headache, nausea, weakness, dizziness, vertigo, irritability, fatigue, lightheadedness, sleepiness, tremor, loss of coordination, judgement and consciousness, coma, and death. It can also cause pulmonary edema. Inhalation of 85 ppm can produce fatigue, insomnia, headache, and mild irritation of the respiratory tract (Haley & Berndt, 1987). Ingestion: Do not drink, pipet or siphon by mouth. May cause gastrointestinal/digestive tract irritation with Abdominal pain, nausea, vomiting. Ethylbenzene is a pulmonary aspiration hazard. Pulmonary aspiration of even small amounts of the liquid may cause fatal pneumonitis. It may also affect behavior/central nervous system with

## Section 12: Ecological Information

### Ecotoxicity:

Ecotoxicity in water (LC50): 14 mg/l 96 hours [Fish (Trout)] (static). 12.1 mg/l 96 hours [Fish (Fathead Minnow)] (flow-through). 150 mg/l 96 hours [Fish (Blue Gill/Sunfish)] (static). 275 mg/l 96 hours [Fish (Sheepshead Minnow)]. 42.3 mg/l 96 hours [Fish (Fathead Minnow)](soft water). 87.6mg/l 96 hours [Shrimp].

**BOD5 and COD:** Not available.

### Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

### Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** CLASS 3: Flammable liquid.

**Identification:** : Ethylbenzene UNNA: 1175 PG: II

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

### Federal and State Regulations:

Connecticut hazardous material survey.: Ethylbenzene Illinois toxic substances disclosure to employee act: Ethylbenzene Illinois chemical safety act: Ethylbenzene New York release reporting list: Ethylbenzene Rhode Island RTK hazardous substances: Ethylbenzene Pennsylvania RTK: Ethylbenzene Minnesota: Ethylbenzene Massachusetts RTK: Ethylbenzene Massachusetts spill list: Ethylbenzene New Jersey: Ethylbenzene New Jersey spill list: Ethylbenzene Louisiana spill reporting: Ethylbenzene California Director's List of Hazardous Substances: Ethylbenzene TSCA 8(b) inventory: Ethylbenzene TSCA 4(a) proposed test rules: Ethylbenzene TSCA 8(d) H and S data reporting: Ethylbenzene: Effective Date: 6/19/87; Sunset Date: 6/19/97 SARA 313 toxic chemical notification and release reporting: Ethylbenzene

### Other Regulations:

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

### Other Classifications:

### WHMIS (Canada):

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASSE D-2B: Material causing other toxic effects (TOXIC).

**DSCL (EEC):**

R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S24/25- Avoid contact with skin and eyes. S29- Do not empty into drains.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 3

**Reactivity:** 0

**Personal Protection:** h

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 3

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

**Section 16: Other Information****References:**

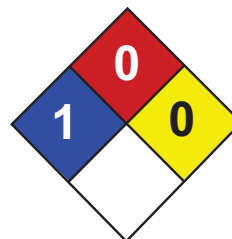
-Manufacturer's Material Safety Data Sheet. -Fire Protection Guide to Hazardous Materials, 13th ed., National Fire Protection Association (NFPA) -Registry of Toxic Effects of Chemical Substances (RTECS) -Chemical Hazard Response Information System (CHRIS) -Hazardous Substance Data Bank (HSDB) -New Jersey Hazardous Substance Fact Sheet -Ariel Global View -Reprotext System

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 05:28 PM

**Last Updated:** 11/01/2010 12:00 PM

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Health	1
Fire	0
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet

### Lead MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Lead

**Catalog Codes:** SLL1291, SLL1669, SLL1081, SLL1459, SLL1834

**CAS#:** 7439-92-1

**RTECS:** OF7525000

**TSCA:** TSCA 8(b) inventory: Lead

**CI#:** Not available.

**Synonym:** Lead Metal, granular; Lead Metal, foil; Lead Metal, sheet; Lead Metal, shot

**Chemical Name:** Lead

**Chemical Formula:** Pb

#### Contact Information:

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

##### Composition:

Name	CAS #	% by Weight
Lead	7439-92-1	100

**Toxicological Data on Ingredients:** Lead LD50: Not available. LC50: Not available.

#### Section 3: Hazards Identification

**Potential Acute Health Effects:** Slightly hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

##### Potential Chronic Health Effects:

Slightly hazardous in case of skin contact (permeator). CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

#### Section 4: First Aid Measures

**Eye Contact:**



Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

**Skin Contact:** Wash with soap and water. Cover the irritated skin with an emollient. Get medical attention if irritation develops.

**Serious Skin Contact:** Not available.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:** Not available.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Non-flammable in presence of open flames and sparks, of shocks, of heat.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** When heated to decomposition it emits highly toxic fumes of lead.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:**

Use appropriate tools to put the spilled solid in a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and dispose of according to local and regional authority requirements.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Finish cleaning by spreading water on the contaminated surface and allow to evacuate through the sanitary system. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up.. Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Wear suitable

protective clothing. If ingested, seek medical advice immediately and show the container or the label. Keep away from incompatibles such as oxidizing agents.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Safety glasses. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 0.05 (mg/m<sup>3</sup>) from ACGIH (TLV) [United States] TWA: 0.05 (mg/m<sup>3</sup>) from OSHA (PEL) [United States] TWA: 0.03 (mg/m<sup>3</sup>) from NIOSH [United States] TWA: 0.05 (mg/m<sup>3</sup>) [Canada] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Metal solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 207.21 g/mole

**Color:** Bluish-white. Silvery. Gray

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 1740°C (3164°F)

**Melting Point:** 327.43°C (621.4°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 11.3 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials, excess heat

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**

Can react vigorously with oxidizing materials. Incompatible with sodium carbide, chlorine trifluoride, trioxane + hydrogen peroxide, ammonium nitrate, sodium azide, disodium acetylide, sodium acetylide, hot concentrated nitric acid, hot concentrated hydrochloric acid, hot concentrated sulfuric acid, zirconium.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Inhalation. Ingestion.

**Toxicity to Animals:**

LD50: Not available. LC50: Not available.

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH, 2B (Possible for human.) by IARC. May cause damage to the following organs: blood, kidneys, central nervous system (CNS).

**Other Toxic Effects on Humans:** Slightly hazardous in case of skin contact (irritant), of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:**

Acute Potential: Skin: Lead metal granules or dust: May cause skin irritation by mechanical action. Lead metal foil, shot or sheets: Not likely to cause skin irritation Eyes: Lead metal granules or dust: Can irritate eyes by mechanical action. Lead metal foil, shot or sheets: No hazard. Will not cause eye irritation. Inhalation: In an industrial setting, exposure to lead mainly occurs from inhalation of dust or fumes. Lead dust or fumes: Can irritate the upper respiratory tract (nose, throat) as well as the bronchi and lungs by mechanical action. Lead dust can be absorbed through the respiratory system. However, inhaled lead does not accumulate in the lungs. All of an inhaled dose is eventually absorbed or transferred to the gastrointestinal tract. Inhalation effects of exposure to fumes or dust of inorganic lead may not develop quickly. Symptoms may include metallic taste, chest pain, decreased physical fitness, fatigue, sleep disturbance, headache, irritability, reduces memory, mood and personality changes, aching bones and muscles, constipation, abdominal pains, decreasing appetite. Inhalation of large amounts may lead to ataxia, delirium, convulsions/seizures, coma, and death. Lead metal foil, shot, or sheets: Not an inhalation hazard unless metal is heated. If metal is heated, fumes will be released. Inhalation of these fumes may cause "fume metal fever", which is characterized by flu-like symptoms. Symptoms may include metallic taste, fever, nausea, vomiting, chills, cough, weakness, chest pain, generalized muscle pain/aches, and increased white blood cell count. Ingestion: Lead metal granules or dust: The symptoms of lead poisoning include abdominal pain or cramps (lead colic), spasms, nausea, vomiting, headache, muscle weakness, hallucinations, distorted perceptions, "lead line" on the gums, metallic taste, loss of appetite, insomnia, dizziness and other symptoms similar to that of inhalation. Acute poisoning may result in high lead levels in the blood and urine, shock, coma and death in extreme cases. Lead metal foil, shot or sheets: Not an ingestion hazard for usual industrial handling.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

**Section 13: Disposal Considerations****Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

**Section 14: Transport Information**

**DOT Classification:** Not a DOT controlled material (United States).

**Identification:** Not applicable.

**Special Provisions for Transport:** Not applicable.

**Section 15: Other Regulatory Information****Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (female) which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause reproductive harm (male) which would require a warning under the statute: Lead California prop. 65 (no significant risk level): Lead: 0.0005 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Lead California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: Lead Connecticut hazardous material survey.: Lead Illinois toxic substances disclosure to employee act: Lead Illinois chemical safety act: Lead New York release reporting list: Lead Rhode Island RTK hazardous substances: Lead Pennsylvania RTK: Lead

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):** CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R20/22- Harmful by inhalation and if swallowed. R33- Danger of cumulative effects. R61- May cause harm to the unborn child. R62- Possible risk of impaired fertility. S36/37- Wear suitable protective clothing and gloves. S44- If you feel unwell, seek medical advice (show the label when possible). S53- Avoid exposure - obtain special instructions before use.

**HMIS (U.S.A.):**

**Health Hazard:** 1

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 1

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Safety glasses.

## Section 16: Other Information

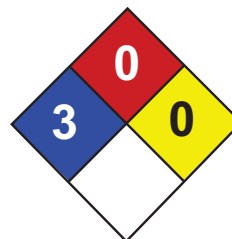
**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:21 PM

**Last Updated:** 11/01/2010 12:00 PM

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Health	3
Fire	0
Reactivity	0
Personal Protection	

## Material Safety Data Sheet

### Mercury MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Mercury

**Catalog Codes:** SLM3505, SLM1363

**CAS#:** 7439-97-6

**RTECS:** OV4550000

**TSCA:** TSCA 8(b) inventory: Mercury

**CI#:** Not applicable.

**Synonym:** Quick Silver; Colloidal Mercury; Metallic Mercury; Liquid Silver; Hydragryum

**Chemical Name:** Mercury

**Chemical Formula:** Hg

#### Contact Information:

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

##### Composition:

Name	CAS #	% by Weight
Mercury	7439-97-6	100

**Toxicological Data on Ingredients:** Mercury LD50: Not available. LC50: Not available.

#### Section 3: Hazards Identification

##### Potential Acute Health Effects:

Very hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator). Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

##### Potential Chronic Health Effects:

Hazardous in case of skin contact (permeator). **CARCINOGENIC EFFECTS:** Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. **MUTAGENIC EFFECTS:** Not available. **TERATOGENIC EFFECTS:** Not available. **DEVELOPMENTAL TOXICITY:** Not available. The substance may be toxic to blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation.

Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

## Section 4: First Aid Measures

### Eye Contact:

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. WARM water MUST be used. Get medical attention immediately.

### Skin Contact:

In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Cover the irritated skin with an emollient. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

### Serious Skin Contact:

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

### Inhalation:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

### Serious Inhalation:

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. **WARNING:** It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

### Ingestion:

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Non-flammable.

**Auto-Ignition Temperature:** Not applicable.

**Flash Points:** Not applicable.

**Flammable Limits:** Not applicable.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** Not applicable.

### Explosion Hazards in Presence of Various Substances:

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:** Not applicable.

### Special Remarks on Fire Hazards:

When thrown into mercury vapor, boron phosphodiiodide ignites at once. Flame forms with chlorine jet over mercury surface at 200 deg to 300 deg C. Mercury undergoes hazardous reactions in the presence of heat and sparks or ignition.

### Special Remarks on Explosion Hazards:

A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. CHLORINE DIOXIDE & LIQUID HG, WHEN MIXED, EXPLODE VIOLENTLY. Mercury and Ammonia can produce an



explosive compound. A mixture of the dry carbonyl and oxygen will explode on vigorous shaking with mercury. Methyl azide in the presence of mercury was shown to be potentially explosive.

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**

Corrosive liquid. Poisonous liquid. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up.. Keep container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, metals.

**Storage:** Keep container tightly closed. Keep container in a cool, well-ventilated area. Do not store above 25°C (77°F).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

TWA: 0.025 from ACGIH (TLV) [United States] SKIN TWA: 0.05 CEIL: 0.1 (mg/m<sup>3</sup>) from OSHA (PEL) [United States]  
Inhalation TWA: 0.025 (mg/m<sup>3</sup>) [United Kingdom (UK)] Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid. (Heavy liquid)

**Odor:** Odorless.

**Taste:** Not available.

**Molecular Weight:** 200.59 g/mole

**Color:** Silver-white

**pH (1% soln/water):** Not available.

**Boiling Point:** 356.73°C (674.1°F)

**Melting Point:** -38.87°C (-38°F)

**Critical Temperature:** 1462°C (2663.6°F)



**Specific Gravity:** 13.55 (Water = 1)

**Vapor Pressure:** Not available.

**Vapor Density:** 6.93 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Very slightly soluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials

**Incompatibility with various substances:** Reactive with oxidizing agents, metals.

**Corrosivity:** Non-corrosive in presence of glass.

### Special Remarks on Reactivity:

Ground mixtures of sodium carbide and mercury, aluminum, lead, or iron can react vigorously. A violent exothermic reaction or possible explosion occurs when mercury comes in contact with lithium and rubidium. Incompatible with boron diiodophosphide; ethylene oxide; metal oxides, metals(aluminum, potassium, lithium, sodium, rubidium); methyl azide; methylsilane, oxygen; oxidants(bromine, peroxyformic acid, chlorine dioxide, nitric acid, tetracarbonylnickel, nitromethane, silver perchlorate, chlorates, sulfuric acid, nitrates,); tetracarbonylnickel, oxygen, acetylinic compounds, ammonia, ethylene oxide, methylsilane, calcium,

### Special Remarks on Corrosivity:

The high mobility and tendency to dispersion exhibited by mercury, and the ease with which it forms alloys (amalgam) with many laboratory and electrical contact metals, can cause severe corrosion problems in laboratories. Special precautions: Mercury can attack copper and copper alloy materials.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

### Toxicity to Animals:

LD50: Not available. LC50: Not available.

### Chronic Effects on Humans:

CARCINOGENIC EFFECTS: Classified A5 (Not suspected for human.) by ACGIH. 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, liver, brain, peripheral nervous system, central nervous system (CNS).

### Other Toxic Effects on Humans:

Very hazardous in case of skin contact (irritant), of ingestion, of inhalation. Hazardous in case of skin contact (corrosive, permeator).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:**

May affect genetic material. May cause cancer based on animal data. Passes through the placental barrier in animal. May cause adverse reproductive effects (paternal effects- spermatogenesis; effects on fertility - fetotoxicity, post-implantation mortality), and birth defects.

**Special Remarks on other Toxic Effects on Humans:**

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** Class 8: Corrosive material

**Identification:** : Mercury UNNA: 2809 PG: III

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Mercury California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Mercury Connecticut hazardous material survey.: Mercury Illinois toxic substances disclosure to employee act: Mercury Illinois chemical safety act: Mercury New York acutely hazardous substances: Mercury Rhode Island RTK hazardous substances: Mercury Pennsylvania RTK: Mercury Minnesota: Mercury Massachusetts RTK: Mercury New Jersey: Mercury New Jersey spill list: Mercury Louisiana spill reporting: Mercury California Director's List of Hazardous Substances.: Mercury TSCA 8(b) inventory: Mercury SARA 313 toxic chemical notification and release reporting: Mercury CERCLA: Hazardous substances.: Mercury: 1 lbs. (0.4536 kg)

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**

CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC). CLASS D-2A: Material causing other toxic effects (VERY TOXIC). CLASS E: Corrosive liquid.

**DSCL (EEC):**

R23- Toxic by inhalation. R33- Danger of cumulative effects. R38- Irritating to skin. R41- Risk of serious damage to eyes. R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. S2- Keep out of the

reach of children. S7- Keep container tightly closed. S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. S39- Wear eye/face protection. S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). S46- If swallowed, seek medical advice immediately and show this container or label. S60- This material and its container must be disposed of as hazardous waste. S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

**HMIS (U.S.A.):**

**Health Hazard:** 3

**Fire Hazard:** 0

**Reactivity:** 0

**Personal Protection:**

**National Fire Protection Association (U.S.A.):**

**Health:** 3

**Flammability:** 0

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Face shield.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/10/2005 08:22 PM

**Last Updated:** 11/01/2010 12:00 PM

*The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall ScienceLab.com be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if ScienceLab.com has been advised of the possibility of such damages.*

# MATERIAL SAFETY DATA SHEET

**ALCONOX®**

Prepared to U.S. OSHA, CMA, ANSI, Canadian WHMIS, Australian WorkSafe, Japanese Industrial Standard JIS Z 7250:2000, and European Union REACH Regulations



## SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: **ALCONOX®**  
CHEMICAL FAMILY NAME: Detergent.  
PRODUCT USE: Critical-cleaning detergent for laboratory, healthcare and industrial applications  
U.N. NUMBER: Not Applicable  
U.N. DANGEROUS GOODS CLASS: Non-Regulated Material  
SUPPLIER/MANUFACTURER'S NAME: Alconox, Inc.  
ADDRESS: 30 Glenn St., Suite 309, White Plains, NY 10603. USA  
EMERGENCY PHONE: **TOLL-FREE in USA/Canada** 800-255-3924  
**International calls** 813-248-0585  
BUSINESS PHONE: 914-948-4040  
DATE OF PREPARATION: May 2011  
DATE OF LAST REVISION: February 2008

## SECTION 2 - HAZARDS IDENTIFICATION

**EMERGENCY OVERVIEW:** This product is a white granular powder with little or no odor. Exposure can be irritating to eyes, respiratory system and skin. It is a non-flammable solid. The Environmental effects of this product have not been investigated.

US DOT SYMBOLS

Non-Regulated

CANADA (WHMIS) SYMBOLS



EUROPEAN and (GHS) Hazard Symbols



Signal Word: **Warning!**

### EU LABELING AND CLASSIFICATION:

Classification of the substance or mixture according to Regulation (EC) No1272/2008 Annex 1

EC# 205-633-8 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 268-356-1 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 231-838-7 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 231-767-1 This substance is not classified in the Annex I of Directive 67/548/EEC

EC# 207-638-8 Index# 011-005-00-2

EC# 205-788-1 This substance is not classified in the Annex I of Directive 67/548/EEC

### GHS Hazard Classification(s):

Eye Irritant Category 2A

### Hazard Statement(s):

H319: Causes serious eye irritation

### Precautionary Statement(s):

P260: Do not breath dust/fume/gas/mist/vapors/spray

P264: Wash hands thoroughly after handling

P271: Use only in well ventilated area.

P280: Wear protective gloves/protective clothing/eye protection/face protection/

### Hazard Symbol(s):

[Xi] Irritant

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**Risk Phrases:**

R20: Harmful by inhalation  
R36/37/38: Irritating to eyes, respiratory system and skin

**Safety Phrases:**

S8: Keep container dry  
S22: Do not breath dust  
S24/25: Avoid contact with skin and eyes

**HEALTH HAZARDS OR RISKS FROM EXPOSURE:**

**ACUTE:** Exposure to this product may cause irritation of the eyes, respiratory system and skin. Ingestion may cause gastrointestinal irritation including pain, vomiting or diarrhea.

**CHRONIC:** This product contains an ingredient which may be corrosive.

**TARGET ORGANS:**

ACUTE: Eye, respiratory System, Skin

CHRONIC: None Known

## SECTION 3 - COMPOSITION and INFORMATION ON INGREDIENTS

HAZARDOUS INGREDIENTS:	CAS #	EINECS #	ICSC #	WT %	HAZARD CLASSIFICATION; RISK PHRASES
Sodium Bicarbonate	144-55-8	205-633-8	1044	33 - 43%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	268-356-1	Not Listed	10 – 20%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Tripolyphosphate	7758-29-4	231-838-7	1469	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Tetrasodium Pyrophosphate	7722-88-5	231-767-1	1140	5 - 15%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Sodium Carbonate	497-19-8	207-638-8	1135	1 - 10%	HAZARD CLASSIFICATION: [Xi] Irritant RISK PHRASES: R36
Sodium Alcohol Sulfate	151-21-3	205-788-1	0502	1 – 5%	HAZARD CLASSIFICATION: None RISK PHRASES: None
Balance of other ingredients are non-hazardous or less than 1% in concentration (or 0.1% for carcinogens, reproductive toxins, or respiratory sensitizers).					

**NOTE:** ALL WHMIS required information is included in appropriate sections based on the ANSI Z400.1-2004 format. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR, EU Directives and the Japanese Industrial Standard JIS Z 7250: 2000.

## SECTION 4 - FIRST-AID MEASURES

Contaminated individuals of chemical exposure must be taken for medical attention if any adverse effect occurs. Rescuers should be taken for medical attention, if necessary. Take copy of label and MSDS to health professional with contaminated individual.

**EYE CONTACT:** If product enters the eyes, open eyes while under gentle running water for at least 15 minutes. Seek medical attention if irritation persists.

**SKIN CONTACT:** Wash skin thoroughly after handling. Seek medical attention if irritation develops and persists. Remove contaminated clothing. Launder before re-use.

**INHALATION:** If breathing becomes difficult, remove victim to fresh air. If necessary, use artificial respiration to support vital functions. Seek medical attention if breathing difficulty continues.

**INGESTION:** If product is swallowed, call physician or poison control center for most current information. If professional advice is not available, do not induce vomiting. Never induce vomiting or give diluents (milk or water) to someone who is unconscious, having convulsions, or who cannot swallow. Seek medical advice. Take a copy of the label and/or MSDS with the victim to the health professional.

**MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE:** Pre-existing skin, or eye problems may be aggravated by prolonged contact.

**RECOMMENDATIONS TO PHYSICIANS:** Treat symptoms and reduce over-exposure.

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## SECTION 5 - FIRE-FIGHTING MEASURES

**FLASH POINT:**

Not Flammable

**AUTOIGNITION TEMPERATURE:**

Not Applicable

**FLAMMABLE LIMITS (in air by volume, %):**

Lower (LEL): NA Upper (UEL): NA

**FIRE EXTINGUISHING MATERIALS:**

As appropriate for surrounding fire. Carbon dioxide, foam, dry chemical, halon, or water spray.

**UNUSUAL FIRE AND EXPLOSION HAZARDS:**

This product is non-flammable and has no known explosion hazards.

Explosion Sensitivity to Mechanical Impact:

Not Sensitive.

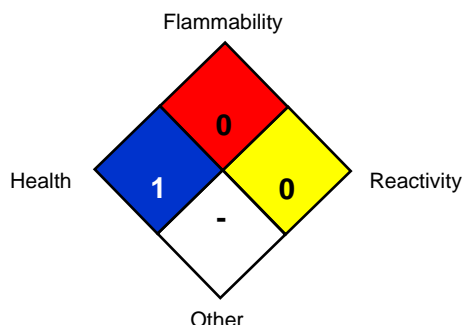
Explosion Sensitivity to Static Discharge:

Not Sensitive



**SPECIAL FIRE-FIGHTING PROCEDURES:**

Incipient fire responders should wear eye protection. Structural firefighters must wear Self-Contained Breathing Apparatus and full protective equipment. Isolate materials not yet involved in the fire and protect personnel. Move containers from fire area if this can be done without risk; otherwise, cool with carefully applied water spray. If possible, prevent runoff water from entering storm drains, bodies of water, or other environmentally sensitive areas.

### NFPA RATING SYSTEM



### HMIS RATING SYSTEM

HAZARDOUS MATERIAL IDENTIFICATION SYSTEM			
HEALTH HAZARD (BLUE)			1
FLAMMABILITY HAZARD (RED)			0
PHYSICAL HAZARD (YELLOW)			0
PROTECTIVE EQUIPMENT			
EYES	RESPIRATORY	HANDS	BODY
	See Sect 8		See Sect 8
For Routine Industrial Use and Handling Applications			

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe \* = Chronic hazard

## SECTION 6 - ACCIDENTAL RELEASE MEASURES

**SPILL AND LEAK RESPONSE:** Personnel should be trained for spill response operations.

**SPILLS:** Contain spill if safe to do so. Prevent entry into drains, sewers, and other waterways. Sweep, shovel or vacuum spilled material and place in an appropriate container for re-use or disposal. Avoid dust generation if possible. Dispose of in accordance with applicable Federal, State, and local procedures (see Section 13, Disposal Considerations).

## SECTION 7 - HANDLING and STORAGE

**WORK PRACTICES AND HYGIENE PRACTICES:** As with all chemicals, avoid getting this product ON YOU or IN YOU. Wash thoroughly after handling this product. Do not eat, drink, smoke, or apply cosmetics while handling this product. Avoid breathing dusts generated by this product. Use in a well-ventilated location. Remove contaminated clothing immediately.

**STORAGE AND HANDLING PRACTICES:** Containers of this product must be properly labeled. Store containers in a cool, dry location. Keep container tightly closed when not in use. Store away from strong acids or oxidizers.

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## SECTION 8 - EXPOSURE CONTROLS - PERSONAL PROTECTION

### EXPOSURE LIMITS/GUIDELINES:

Chemical Name	CAS#	ACGIH TWA	OSHA TWA	SWA
Sodium Bicarbonate	144-55-8	10 mg/m <sup>3</sup> Total Dust	15 mg/m <sup>3</sup> Total Dust	10 mg/m <sup>3</sup> Total Dust
Sodium (C10 – C16) Alkylbenzene Sulfonate	68081-81-2	10 mg/m <sup>3</sup> Total Dust	15 mg/m <sup>3</sup> Total Dust	10 mg/m <sup>3</sup> Total Dust
Sodium Tripolyphosphate	7758-29-4	10 mg/m <sup>3</sup> Total Dust	15 mg/m <sup>3</sup> Total Dust	10 mg/m <sup>3</sup> Total Dust
Tetrasodium Pyrophosphate	7722-88-5	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>	5 mg/m <sup>3</sup>
Sodium Carbonate	497-19-8	10 mg/m <sup>3</sup> Total Dust	15 mg/m <sup>3</sup> Total Dust	10 mg/m <sup>3</sup> Total Dust
Sodium Alcohol Sulfate	151-21-3	10 mg/m <sup>3</sup> Total Dust	15 mg/m <sup>3</sup> Total Dust	10 mg/m <sup>3</sup> Total Dust

Currently, International exposure limits are not established for the components of this product. Please check with competent authority in each country for the most recent limits in place.

**VENTILATION AND ENGINEERING CONTROLS:** Use with adequate ventilation to ensure exposure levels are maintained below the limits provided below. Use local exhaust ventilation to control airborne dust. Ensure eyewash/safety shower stations are available near areas where this product is used.

*The following information on appropriate Personal Protective Equipment is provided to assist employers in complying with OSHA regulations found in 29 CFR Subpart I (beginning at 1910.132) or equivalent standard of Canada, or standards of EU member states (including EN 149 for respiratory PPE, and EN 166 for face/eye protection), and those of Japan. Please reference applicable regulations and standards for relevant details.*

**RESPIRATORY PROTECTION:** Based on test data, exposure limits should not be exceeded under normal use conditions when using Alconox Detergent. Maintain airborne contaminant concentrations below guidelines listed above, if applicable. If necessary, use only respiratory protection authorized in the U.S. Federal OSHA Respiratory Protection Standard (29 CFR 1910.134), equivalent U.S. State standards, Canadian CSA Standard Z94.4-93, the European Standard EN149, or EU member states.

**EYE PROTECTION:** Safety glasses. If necessary, refer to U.S. OSHA 29 CFR 1910.133 or appropriate Canadian Standards.

**HAND PROTECTION:** Use chemical resistant gloves to prevent skin contact.. If necessary, refer to U.S. OSHA 29 CFR 1910.138 or appropriate Standards of Canada.

**BODY PROTECTION:** Use body protection appropriate to prevent contact (e.g. lab coat, overalls). If necessary, refer to appropriate Standards of Canada, or appropriate Standards of the EU, Australian Standards, or relevant Japanese Standards.

## SECTION 9 - PHYSICAL and CHEMICAL PROPERTIES

<b>PHYSICAL STATE:</b>	Solid
<b>APPEARANCE &amp; ODOR:</b>	White granular powder with little or no odor.
<b>ODOR THRESHOLD (PPM):</b>	Not Available
<b>VAPOR PRESSURE (mmHg):</b>	Not Applicable
<b>VAPOR DENSITY (AIR=1):</b>	Not Applicable.
<b>BY WEIGHT:</b>	Not Available
<b>EVAPORATION RATE (nBuAc = 1):</b>	Not Applicable.
<b>BOILING POINT (C°):</b>	Not Applicable.
<b>FREEZING POINT (C°):</b>	Not Applicable.
<b>pH:</b>	9.5 (1% aqueous solution)
<b>SPECIFIC GRAVITY 20°C: (WATER =1)</b>	0.85 – 1.1
<b>SOLUBILITY IN WATER (%)</b>	>10% w/w
<b>COEFFICIENT OF WATER/OIL DIST.:</b>	Not Available
<b>VOC:</b>	None
<b>CHEMICAL FAMILY:</b>	Detergent

# MATERIAL SAFETY DATA SHEET

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## SECTION 10 - STABILITY and REACTIVITY

**STABILITY:** Product is stable

**DECOMPOSITION PRODUCTS:** When heated to decomposition this product produces Oxides of carbon (COx)

**MATERIALS WITH WHICH SUBSTANCE IS INCOMPATIBLE:** Strong acids and strong oxidizing agents.

**HAZARDOUS POLYMERIZATION:** Will not occur.

**CONDITIONS TO AVOID:** Contact with incompatible materials and dust generation.

## SECTION 11 - TOXICOLOGICAL INFORMATION

**TOXICITY DATA:** Toxicity data is available for mixture:

CAS# 497-19-8 LD50 Oral (Rat)	4090 mg/kg
CAS# 497-19-8 LD50 Oral (Mouse)	6600 mg/kg
CAS# 497-19-8 LC50 Inhalation (Rat)	2300 mg/m <sup>3</sup> 2H
CAS# 497-19-8 LC50 Inhalation (Mouse)	1200 mg/m <sup>3</sup> 2H
CAS# 7758-29-4 LD50 Oral (Rat)	3120 mg/kg
CAS# 7758-29-4 LD50 Oral (Mouse)	3100 mg/kg
CAS# 7722-88-5 LD50 Oral (Rat)	4000 mg/kg

**SUSPECTED CANCER AGENT:** None of the ingredients are found on the following lists: FEDERAL OSHA Z LIST, NTP, CAL/OSHA, IARC and therefore is not considered to be, nor suspected to be a cancer-causing agent by these agencies.

**IRRITANCY OF PRODUCT:** Contact with this product can be irritating to exposed skin, eyes and respiratory system.

**SENSITIZATION OF PRODUCT:** This product is not considered a sensitizer.

**REPRODUCTIVE TOXICITY INFORMATION:** No information concerning the effects of this product and its components on the human reproductive system.

## SECTION 12 - ECOLOGICAL INFORMATION

**ALL WORK PRACTICES MUST BE AIMED AT ELIMINATING ENVIRONMENTAL CONTAMINATION.**

**ENVIRONMENTAL STABILITY:** No Data available at this time.

**EFFECT OF MATERIAL ON PLANTS or ANIMALS:** No evidence is currently available on this product's effects on plants or animals.

**EFFECT OF CHEMICAL ON AQUATIC LIFE:** No evidence is currently available on this product's effects on aquatic life.

## SECTION 13 - DISPOSAL CONSIDERATIONS

**PREPARING WASTES FOR DISPOSAL:** Waste disposal must be in accordance with appropriate Federal, State, and local regulations, those of Canada, Australia, EU Member States and Japan.

## SECTION 14 - TRANSPORTATION INFORMATION

**US DOT; IATA; IMO; ADR:**

**THIS PRODUCT IS NOT HAZARDOUS AS DEFINED BY 49 CFR 172.101 BY THE U.S. DEPARTMENT OF TRANSPORTATION.**

**PROPER SHIPPING NAME:** Non-Regulated Material

**HAZARD CLASS NUMBER and DESCRIPTION:** Not Applicable

**UN IDENTIFICATION NUMBER:** Not Applicable

**PACKING GROUP:** Not Applicable.

**DOT LABEL(S) REQUIRED:** Not Applicable

**NORTH AMERICAN EMERGENCY RESPONSE GUIDEBOOK NUMBER (2004):** Not Applicable

**MARINE POLLUTANT:** None of the ingredients are classified by the DOT as a Marine Pollutant (as defined by 49 CFR 172.101, Appendix B)

**U.S. DEPARTMENT OF TRANSPORTATION (DOT) SHIPPING REGULATIONS:**

This product is not classified as dangerous goods, per U.S. DOT regulations, under 49 CFR 172.101.

**TRANSPORT CANADA, TRANSPORTATION OF DANGEROUS GOODS REGULATIONS:**

This product is not classified as Dangerous Goods, per regulations of Transport Canada.

**INTERNATIONAL AIR TRANSPORT ASSOCIATION (IATA):**

This product is not classified as Dangerous Goods, by rules of IATA:

**INTERNATIONAL MARITIME ORGANIZATION (IMO) DESIGNATION:**

This product is not classified as Dangerous Goods by the International Maritime Organization.

**EUROPEAN AGREEMENT CONCERNING THE INTERNATIONAL CARRIAGE OF DANGEROUS GOODS BY ROAD (ADR):**



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**ALCONOX®**

This product is not classified by the United Nations Economic Commission for Europe to be dangerous goods.

## SECTION 15 - REGULATORY INFORMATION

### UNITED STATES REGULATIONS

**SARA REPORTING REQUIREMENTS:** This product is not subject to the reporting requirements of Sections 302, 304 and 313 of Title III of the Superfund Amendments and Reauthorization Act., as follows: None

**TSCA:** All components in this product are listed on the US Toxic Substances Control Act (TSCA) inventory of chemicals.

#### SARA 311/312:

Acute Health: Yes                      Chronic Health: No                      Fire: No                      Reactivity: No

**U.S. SARA THRESHOLD PLANNING QUANTITY:** There are no specific Threshold Planning Quantities for this product. The default Federal MSDS submission and inventory requirement filing threshold of 10,000 lb (4,540 kg) may apply, per 40 CFR 370.20.

**U.S. CERCLA REPORTABLE QUANTITY (RQ):** None

**CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT (PROPOSITION 65):** None of the ingredients are on the California Proposition 65 lists.

### CANADIAN REGULATIONS:

**CANADIAN DSL/NDL INVENTORY STATUS:** All of the components of this product are on the DSL Inventory

**CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA) PRIORITIES SUBSTANCES LISTS:** No component of this product is on the CEPA First Priorities Substance Lists.

**CANADIAN WHMIS CLASSIFICATION and SYMBOLS:** This product is categorized as a Controlled Product, Hazard Class D2B as per the Controlled Product Regulations

### EUROPEAN ECONOMIC COMMUNITY INFORMATION:

#### EU LABELING AND CLASSIFICATION:

Classification of the mixture according to Regulation (EC) No1272/2008. See section 2 for details.

### AUSTRALIAN INFORMATION FOR PRODUCT:

**AUSTRALIAN INVENTORY OF CHEMICAL SUBSTANCES (AICS) STATUS:** All components of this product are listed on the AICS.

**STANDARD FOR THE UNIFORM SCHEDULING OF DRUGS AND POISONS:** Not applicable.

### JAPANESE INFORMATION FOR PRODUCT:

**JAPANESE MINISTER OF INTERNATIONAL TRADE AND INDUSTRY (MITI) STATUS:** The components of this product are not listed as Class I Specified Chemical Substances, Class II Specified Chemical Substances, or Designated Chemical Substances by the Japanese MITI.

### INTERNATIONAL CHEMICAL INVENTORIES:

Listing of the components on individual country Chemical Inventories is as follows:

Asia-Pac:	Listed
Australian Inventory of Chemical Substances (AICS):	Listed
Korean Existing Chemicals List (ECL):	Listed
Japanese Existing National Inventory of Chemical Substances (ENCS):	Listed
Philippines Inventory of Chemicals and Chemical Substances (PICCS):	Listed
Swiss Giftlist of Toxic Substances:	Listed
U.S. TSCA:	Listed

## SECTION 16 - OTHER INFORMATION

**PREPARED BY:** Paul Eigbrett      Global Safety Management, 10006 Cross Creek Blvd. Suite 440, Tampa, FL 33647

# MATERIAL SAFETY DATA SHEET

**ALCONOX®**

**Disclaimer:** To the best of Alconox, Inc. knowledge, the information contained herein is reliable and accurate as of this date; however, accuracy, suitability or completeness is not guaranteed and no warranties of any type either express or implied are provided. The information contained herein relates only to this specific product.

## ANNEX:

### IDENTIFIED USES OF ALCONOX® AND DIRECTIONS FOR USE

**Used to clean:** Healthcare instruments, laboratory ware, vacuum equipment, tissue culture ware, personal protective equipment, sampling apparatus, catheters, tubing, pipes, radioactive contaminated articles, optical parts, electronic components, pharmaceutical apparatus, cosmetics manufacturing equipment, metal castings, forgings and stampings, industrial parts, tanks and reactors. Authorized by USDA for use in federally inspected meat and poultry plants. Passes inhibitory residue test for water analysis. FDA certified.

**Used to remove:** Soil, grit, grime, buffing compound, slime, grease, oils, blood, tissue, salts, deposits, particulates, solvents, chemicals, radioisotopes, radioactive contaminations, silicon oils, mold release agents.

**Surfaces cleaned:** Corrosion inhibited formulation recommended for glass, metal, stainless steel, porcelain, ceramic, plastic, rubber and fiberglass. Can be used on soft metals such as copper, aluminum, zinc and magnesium if rinsed promptly. Corrosion testing may be advisable.

**Cleaning method:** Soak, brush, sponge, cloth, ultrasonic, flow through clean-inplace. Will foam—not for spray or machine use.

**Directions:** Make a fresh 1% solution (2 1/2 Tbsp. per gal., 1 1/4 oz. per gal. or 10 grams per liter) in cold, warm, or hot water. If available use warm water. Use cold water for blood stains. For difficult soils, raise water temperature and use more detergent. Clean by soak, circulate, wipe, or ultrasonic method. Not for spray machines, will foam. For nonabrasive scouring, make paste. Use 2% solution to soak frozen stopcocks. To remove silver tarnish, soak in 1% solution in aluminum container. RINSE THOROUGHLY—preferably with running water. For critical cleaning, do final or all rinsing in distilled, deionized, or purified water. For food contact surfaces, rinse with potable water. Used on a wide range of glass, ceramic, plastic, and metal surfaces. Corrosion testing may be advisable.

# Monsanto

## Material Safety Data

### POLYCHLORINATED BIPHENYLS (PCBs)

Emergency Phone No.  
(Call Collect)  
314-694-1000

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#### 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

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PRODUCT NAME: **POLYCHLORINATED BIPHENYLS (PCBs)**  
Aroclor® Series 1016, 1221, 1232, 1242, 1248, 1254, 1260, 1262, 1268  
Therminol® FR Series

MSDS Number: M00018515

Date: 12/95

Chemical Family: Chlorinated Hydrocarbons  
Chemical Name: Polychlorinated biphenyls  
Synonyms: PCBs, Chlorodiphenyls, Chlorinated biphenyls

#### Trade Names/Common Names:

PYRANOL® and INERTEEN® are trade names for commonly used dielectric fluids that may have contained varying amounts of PCBs as well as other components including chlorinated benzenes.

ASKAREL is the generic name for a broad class of fire resistant synthetic chlorinated hydrocarbons and mixtures used as dielectric fluids that commonly contained about 30 - 70% PCBs. Some ASKAREL fluids contained 99% or greater PCBs and some contained no PCBs.

PYDRAUL® is the trade name for hydraulic fluids that, prior to 1972, may have contained varying amounts of PCBs and other components including phosphate esters.

The product names/trade names are representative of several commonly used Monsanto products (or products formulated with Monsanto products). Other trademarked PCB products were marketed by Monsanto and other manufacturers. PCBs were also manufactured and sold by several European and Japanese companies. Contact the manufacturer of the trademarked product, if not in this listing, to determine if the formulation contained PCBs.

In 1972, Monsanto restricted sales of PCBs to applications involving only closed electrical systems, (transformers and capacitors). In 1977, all manufacturing and sales were voluntarily terminated. In 1979, EPA restricted the manufacture, processing, use, and distribution of PCBs to specifically exempted and authorized activities.

**MONSANTO COMPANY, 800 N. LINDBERGH BLVD., ST. LOUIS, MO 63167**

FOR CHEMICAL EMERGENCY, SPILL, LEAK, FIRE, EXPOSURE, OR ACCIDENT  
Call CHEMTREC - Day or Night - 1-800-424-9300 Toll free in the continental U.S., Hawaii, Puerto Rico, Canada, Alaska, or Virgin Islands. For calls originating elsewhere: 202-483-7616 (collect calls accepted)

For additional nonemergency information, call: 314-694-3344.

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## 2. COMPOSITION/INFORMATION ON INGREDIENTS

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Chemically, commercial PCBs are defined as a series of technical mixtures, consisting of many isomers and compounds that vary from mobile, oily liquids to white crystalline solids and hard noncrystalline resins. Technical products vary in composition, in the degree of chlorination, and possibly according to batch.

The mixtures generally used contain an average of 3 atoms of chlorine per molecule (42% chlorine) to 5 atoms of chlorine per molecule (54% chlorine). They were used as components of dielectric fluids in transformers and capacitors. Prior to 1972, PCB applications included heat transfer media, hydraulic, and other industrial fluids, plasticizers, carbonless copy paper, paints, inks, and adhesives.

<u>Component</u>	<u>CAS No.</u>
chlorinated biphenyl	1336-36-3
Aroclor 1016	12674-11-2
Aroclor 1221	11104-28-2
Aroclor 1232	11141-16-5
Aroclor 1242	53469-21-9
Aroclor 1248	12672-29-6
Aroclor 1254	11097-69-1
Aroclor 1260	11096-82-5
Aroclor 1262	37324-23-5
Aroclor 1268	11100-14-4

There are also CAS Numbers for individual PCB congeners and for mixtures of Aroclor® products.

PCBs are identified as hazardous chemicals under criteria of the OSHA Hazard Communication Standard (29 CFR Part 1910.1200). PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Annual Report on Carcinogens (Seventh).

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## 3. HAZARDS IDENTIFICATION

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### EMERGENCY OVERVIEW

Appearance and Odor: PCB mixtures range in form and color from clear to amber liquids to white crystalline solids. They have a mild, distinctive odor and are not volatile at room temperature. Refer to Section 9 for details.

WARNING!  
CAUSES EYE IRRITATION  
MAY CAUSE SKIN IRRITATION

PROCESSING AT ELEVATED TEMPERATURES MAY RELEASE VAPORS OR FUMES WHICH MAY CAUSE RESPIRATORY TRACT IRRITATION

### POTENTIAL HEALTH EFFECTS

#### Likely Routes

of Exposure: Skin contact and inhalation of heated vapors

Eye Contact: Causes moderate irritation based on worker experience.

Skin Contact: Prolonged or repeated contact may result in redness, dry skin and defatting based on human experience. A potential exists for developing chloracne. PCBs can be absorbed through intact skin.

Inhalation: Due to the low volatility of PCBs, exposure to this material in ambient conditions is not expected to produce adverse health effects. However, at elevated processing temperatures, PCBs may produce a vapor that may cause respiratory tract irritation if inhaled based on human experience.

Ingestion: No more than slightly toxic based on acute animal toxicity studies. Coughing, choking and shortness of breath may occur if liquid material is accidentally drawn into the lungs during swallowing or vomiting.

Other: Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed populations, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

Refer to Section 11 for toxicological information.

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#### 4. FIRST AID MEASURES

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IF IN EYES, immediately flush with plenty of water for at least 15 minutes. If easy to do, remove any contact lenses. Get medical attention. Remove material from skin and clothing.

IF ON SKIN, immediately flush the area with plenty of water. Wash skin gently with soap as soon as it is available. Get medical attention if irritation persists.

IF INHALED, remove person to fresh air. If breathing is difficult, get medical attention.

IF SWALLOWED, do NOT induce vomiting. Rinse mouth with water. Get medical attention. Contact a Poison Control Center. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON.

NOTE TO PHYSICIANS: Hot PCBs may cause thermal burn. If electrical equipment arcs between conductors, PCBs or other chlorinated hydrocarbon dielectric fluids may decompose to produce hydrochloric acid (HCl), a respiratory irritant. If large amounts are swallowed, gastric lavage may be considered.

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#### 5. FIRE FIGHTING MEASURES

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Flash Point: 284 degrees F (140 degrees C) or higher depending on the chlorination level of the Aroclor product

Fire Point: 349 degrees F (176 degrees C) or higher depending on the chlorination level of the Aroclor product

NOTE: Refer to Section 9 for individual flash points and fire points.

##### Extinguishing

Media: Extinguish fire using agent suitable for surrounding fire. Use dry chemical, foam, carbon dioxide or water spray. Water may be ineffective. Use water spray to keep fire-exposed containers or transformer cool.

PCBs are fire-resistant compounds. They may decompose to form CO, CO<sub>2</sub>, HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surfaces.

Dielectric fluids having PCBs and chlorinated benzenes as components have been reported to produce polychlorinated dibenzo-p-dioxins (PCDDs) and furans (PCDFs) during fire situations involving electrical equipment. At temperatures in the range of 600-650 degrees C in the presence of excess oxygen, PCBs may form polychlorinated dibenzofurans (PCDFs). Laboratory studies under similar conditions have demonstrated that PCBs do not produce polychlorinated dibenzo-p-dioxins (PCDDs).

Federal regulations require all PCB transformers to be registered with fire response personnel.

If a PCB transformer is involved in a fire-related incident, the owner of the transformer may be required to report the incident. Consult and follow appropriate federal, state and local regulations.

Fire Fighting Equipment: Fire fighters and others exposed to products of combustion should wear self-contained breathing apparatus. Equipment should be thoroughly decontaminated after use.

## 6. ACCIDENTAL RELEASE MEASURES

Cleanup and disposal of liquid PCBs and other PCB items are strictly regulated by the federal government. The regulations are found at 40 CFR Part 761. Consult these regulations as well as applicable state and local regulations prior to any cleanup or disposal of PCBs, PCB items, or PCB contaminated items.

If PCBs leak or are spilled, the following steps should be taken immediately:

All nonessential personnel should leave the leak or spill area.

The area should be adequately ventilated to prevent the accumulation of vapors.

The spill/leak should be contained. Loss to sewer systems, navigable waterways, and streams should be prevented. Spills/leaks should be removed promptly by means of absorptive material, such as sawdust, vermiculite, dry sand, clay, dirt or other similar materials, or trapped and removed by pumping or other suitable means (traps, drip-pans, trays, etc.).

Personnel entering the spill or leak area should be furnished with appropriate personal protective equipment and clothing as needed. Refer to Section 8 for personal protection equipment and clothing.

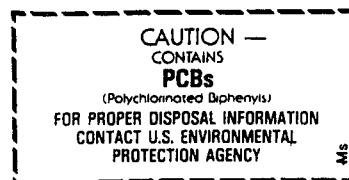
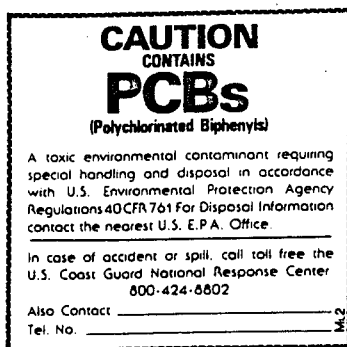
Personnel trained in emergency procedures and protected against attendant hazards should shut off sources of PCBs, clean up spills, control and repair leaks, and fight fires in PCB areas.

Refer to Section 13 for disposal information and Sections 14 and 15 for information regarding reportable quantity, and Section 7 for marking information.

## 7. HANDLING AND STORAGE

Care should be taken to prevent entry into the environment through spills, leakage, use vaporization, or disposal of liquid or containers. Avoid prolonged breathing of vapors or mists. Avoid contact with eyes or prolonged contact with skin. If skin contact occurs, remove by washing with soap and water. Following eye contact, flush with water. In case of spillage onto clothing, the clothing should be removed as soon as practical, skin washed, and clothing laundered. Comply with all federal, state, and local regulations.

Federal regulations under the Toxic Substances Control Act require PCBs, PCB items, storage areas, transformer vaults, and transport vehicles to be marked (check regulations, 40 CFR 761, for details).



**Storage:** The storage of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB waste is strictly regulated by 40 CFR Part 761. The storage time is limited, the storage area must meet physical requirements, and the area must be labeled.

**Avoid contact with eyes.**  
**Wash thoroughly after handling.**  
**Avoid breathing processing fumes or vapors.**  
**Process using adequate ventilation.**

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## 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

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**Eye Protection:** Wear chemical splash goggles and have eye baths available where there is significant potential for eye contact.

**Skin Protection:** Wear appropriate protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine the appropriate type glove for a given application. Wear chemical goggles, face shield, and chemical resistant clothing such as a rubber apron when splashing is likely. Wash immediately if skin is contacted. Remove contaminated clothing promptly and launder before reuse. Clean protective equipment before reuse. Provide a safety shower at any location where skin contact can occur. Wash thoroughly after handling.

ATTENTION! Repeated or prolonged skin contact may cause chloracne in some people.

**Respiratory Protection:** Avoid breathing vapor, mist, or dust. Use NIOSH/MSHA approved equipment when airborne exposure limits are exceeded. Full facepiece equipment is recommended when airborne exposure limits are exceeded and, if used, replaces the need for face shield and/or chemical splash goggles. Consult respirator manufacturer to determine the type of equipment for a given application. The respirator use limitations specified by NIOSH/MSHA or the manufacturer must be observed. High airborne concentrations may require use of self-contained breathing apparatus or supplied air respirator. Respiratory protection programs must be in compliance with 29 CFR Part 1910.134.

ATTENTION! Repeated or prolonged inhalation may cause chloracne in some people.

**Ventilation:** Provide natural or mechanical ventilation to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of vapor or mist, such as open process equipment.

### Airborne Exposure Limits:

**Product:** Chlorodiphenyl (42% chlorine)

OSHA PEL: 1 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*  
ACGIH TLV: 1 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*

**Product:** Chlorodiphenyl (54% chlorine)

OSHA PEL: 0.5 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*  
ACGIH TLV: 0.5 mg/m<sup>3</sup> 8-hour time-weighted average - Skin\*

\*For Skin notation see Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices, American Conference of Government Industrial Hygienists, 1995-1996.

## 9. PHYSICAL AND CHEMICAL PROPERTIES

PROPERTIES OF SELECTED AROCLORS <sup>®</sup>							
PROPERTY	1016	1221	1232	1242	1248	1254	1260
Color (APHA)	40	100	100	100	100	100	150
Physical state	mobile oil	mobile oil	mobile oil	mobile oil	mobile oil	viscous liquid	sticky resin
Stability	inert	inert	inert	inert	inert	inert	inert
Density (lb/gal 25°C)	11.40	9.85	10.55	11.50	12.04	12.82	13.50
Specific gravity x/15.5°C	1.36-1.37 x-25°	1.18-1.19 x-25°	1.27-1.28 x-25°	1.30-1.39 x-25°	1.40-1.41 x-65°	1.49-1.50 x-65°	1.55-1.56 x-90°
Distillation range (°C)	323-356	275-320	290-325	325-366	340-375	365-390	385-420
Acidity mg KOH/g, maximum	.010	.014	.014	.015	.010	.010	.014
Fire point (°C)	none to boiling point	176	238	none to boiling point	none to boiling point	none to boiling point	none to boiling point
Flash point (°C)	170	141-150	152-154	176-180	193-196	none	none
Vapor pressure (mm Hg @ 100°F)	NA	NA	0.005	0.001	0.00037	0.00006	NA
Viscosity (Saybolt Univ. Sec. @ 100°F) (centistokes)	71-81 13-16	38-41 3.6-4.6	44-51 5.5-7.7	82-92 16-19	185-240 42-52	1800-2500 390-540	— —

NA—Not Available

NOTE: These physical data are typical values based on material tested but may vary from sample to sample. Typical values should not be construed as a guaranteed analysis of any specific lot or as specifications for the product.

## 10. STABILITY AND REACTIVITY

Stability: PCBs are very stable, fire-resistant compounds.

Materials to Avoid: None

Hazardous Decomposition

Products: PCBs may decompose to form CO, CO<sub>2</sub>, HCl, phenolics, aldehydes, and other toxic combustion products under severe conditions such as exposure to flame or hot surface.

Hazardous Polymerization: Does not occur.

## 11. TOXICOLOGICAL INFORMATION

Data from laboratory studies conducted by Monsanto and from the available scientific literature are summarized below.

Single exposure (acute) studies indicate:

Oral - Slightly Toxic (Rat LD50 - 8.65 g/kg for 42% chlorinated; 11.9 g/kg for 54% chlorinated)



The liquid products and their vapors are moderately irritating to eye tissues. Animal experiments of varying duration and at different air concentrations show that for similar exposure conditions, the 54% chlorinated material produces more liver injury than the 42% chlorinated material.

There are literature reports that PCBs can impair reproductive functions in monkeys. The National Cancer Institute (NCI) performed a study in 1977 using Aroclor 1254 with both sexes of rats. NCI stated that the PCB, Aroclor 1254, was not carcinogenic under the conditions of their bioassay. There is sufficient evidence in the scientific literature to conclude that Aroclor 1260 can cause liver cancer when fed to rodents at high doses. Similar experiments with less chlorinated PCB products have produced negative or equivocal results.

The consistent finding in animal studies is that PCBs produce liver injury following prolonged and repeated exposure by any route, if the exposure is of sufficient degree and duration. Liver injury is produced first, and by exposures that are less than those reported to cause cancer in rodents. Therefore, exposure by all routes should be kept sufficiently low to prevent liver injury.

Numerous epidemiological studies of humans, both occupationally exposed and nonworker environmentally exposed population, have not demonstrated any causal relationship between PCB exposure and chronic human illnesses such as cancer or neurological or cardiovascular effects. PCBs at high dosage can cause skin symptoms; however, these subside upon removal of the exposure source.

PCBs have been listed in the International Agency for Research on Cancer (IARC) Monographs (1987)-Group 2A and in the National Toxicology Program (NTP) Seventh Annual Report on Carcinogens.

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## 12. ECOLOGICAL INFORMATION

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Care should be taken to prevent entry of PCBs into the environment through spills, leakage, use, vaporization or disposal of liquid or solids. PCBs can accumulate in the environment and can adversely affect some animals and aquatic life. In general, PCBs have low solubility in water, are strongly bound to soils and sediments, and are slowly degraded by natural processes in the environment.

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## 13. DISPOSAL CONSIDERATIONS

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The disposal of PCB items or equipment (those containing 50 ppm or greater PCBs) and PCB wastes is strictly regulated by 40 CFR Part 761. For example, all wastes and residues containing PCBs (wiping cloths, absorbent material, used disposable protective gloves and clothing, etc.) should be collected, placed in proper containers, marked and disposed of in the manner prescribed by EPA regulations (40 CFR Part 761) and applicable state and local regulations.

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## 14. TRANSPORT INFORMATION

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The data provided in this section are for information only. Please apply the appropriate regulations to properly classify a shipment for transportation.

DOT Classification:	IF WEIGHT OF PCBs TO BE SHIPPED IS OVER ONE POUND, THE FOLLOWING CLASSIFICATION AND LABEL APPLY.
DOT Label:	LIQUID: Environmentally Hazardous Substance, liquid, n.o.s. (Contains PCB), 9, UN 3082, III
	SOLID: Environmentally Hazardous Substance, solid, n.o.s. (Contains PCB), 9, UN 3077, III
DOT Label:	Class: 9
DOT Reportable Quantity:	One Pound
IMO Classification:	Polychlorinated Biphenyls, IMO Class 9, UN 2315, II
	IMO Page 9034, EMS 6.1-02
IATA/ICAO Classification:	Polychlorinated Biphenyls, 9, UN2315, II

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**15. REGULATORY INFORMATION**

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For regulatory purposes, under the Toxic Substances Control Act, the term "PCBs" refers to a chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees or any combination of substances which contain such a substance (40 CFR Part 761).

TSCA Inventory: not listed.

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370): Immediate, Delayed.  
SARA Section 313 Toxic Chemical(s): Listed-1993 (De Minimis concentration 0.1%).

Reportable Quantity (RQ) under DOT (49 CFR) and CERCLA Regulations: 1 lb. (polychlorinated biphenyls) PCBs.

Release of more than 1 (one) pound of PCBs to the environment requires notification to the National Response Center (800-424-8802 or 202-426-2675).

Various state and local regulations may require immediate reporting of PCB spills and may also define spill cleanup levels. Consult your attorney or appropriate regulatory officials for information relating to spill reporting and spill cleanup.

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**16. OTHER INFORMATION**

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Reason for revision: Conversion to the 16 section format. Supersedes MSDS dated 10/88.

Therminol® Aroclor® and Pydraul® are registered trademarks of Monsanto Company  
Pyranol® is a registered trademark of General Electric Company  
Inerteen® is a registered trademark of Westinghouse Electric Corporation

FOR ADDITIONAL NONEMERGENCY INFORMATION, CONTACT:

Gary W. Mappes  
Manager, Product & Environmental Safety

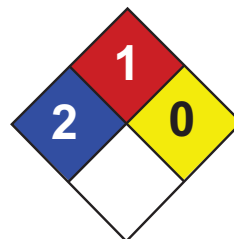
Robert G. Kaley, II  
Director, Environmental Affairs

Monsanto Company  
800 North Lindbergh Boulevard  
St. Louis, MO 63167  
(314) 694-3344

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Health	2
Fire	1
Reactivity	0
Personal Protection	E

## Material Safety Data Sheet

### Selenium MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Selenium

**Catalog Codes:** SLS2629

**CAS#:** 7782-49-2

**RTECS:** VS7700000

**TSCA:** TSCA 8(b) inventory: Selenium

**CI#:** Not available.

**Synonym:**

**Chemical Name:** Not available.

**Chemical Formula:** Se

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Selenium	7782-49-2	100

**Toxicological Data on Ingredients:** Selenium: ORAL (LD50): Acute: 6700 mg/kg [Rat].

#### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Hazardous in case of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated or prolonged exposure is not known to aggravate medical condition.

#### Section 4: First Aid Measures

**Eye Contact:** Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

**Skin Contact:**

After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

**Serious Skin Contact:** Not available.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

Do not induce vomiting. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Not available.

**Fire Hazards in Presence of Various Substances:** Not available.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Material in powder form, capable of creating a dust explosion.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:** Use appropriate tools to put the spilled solid in a convenient waste disposal container.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**

Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label.

**Storage:**

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

### Personal Protection:

Splash goggles. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Dust respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 0.2 (mg/m<sup>3</sup>) Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Solid metallic powder.)

**Odor:** Odorless.

**Taste:** Not available.

**Molecular Weight:** 78.96 g/mole

**Color:** Not available.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 684.9°C (1264.8°F)

**Melting Point:** 217°C (422.6°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 4.81 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Not available.

**Solubility:** Insoluble in cold water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** No.

## Section 11: Toxicological Information

**Routes of Entry:** Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 6700 mg/kg [Rat].

**Chronic Effects on Humans:** Not available.

**Other Toxic Effects on Humans:**

Hazardous in case of ingestion, of inhalation. Slightly hazardous in case of skin contact (irritant).

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Passes through the placental barrier in animal. Excreted in maternal milk in human.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are more toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:** CLASS 6.1: Poisonous material.

**Identification:** : Selenium powder : UN2658 PG: III

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**

Pennsylvania RTK: Selenium Massachusetts RTK: Selenium TSCA 8(b) inventory: Selenium SARA 313 toxic chemical notification and release reporting: Selenium CERCLA: Hazardous substances.: Selenium

**Other Regulations:** OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

**Other Classifications:**

**WHMIS (Canada):** CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

**DSCL (EEC):** R36- Irritating to eyes.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Dust respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

**Section 16: Other Information**

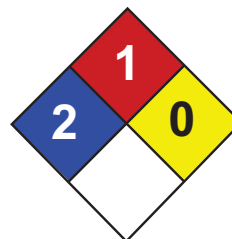
**References:** Not available.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 06:24 PM

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Health	2
Fire	1
Reactivity	0
Personal Protection	J

## Material Safety Data Sheet

### Silver MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Silver

**Catalog Codes:** SLS4222, SLS2005, SLS3427, SLS1210, SLS2632, SLS4054, SLS1837

**CAS#:** 7440-22-4

**RTECS:** VW3500000

**TSCA:** TSCA 8(b) inventory: Silver

**CI#:** Not applicable.

**Synonym:**

**Chemical Formula:** Ag

#### Contact Information:

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**  
1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

##### Composition:

Name	CAS #	% by Weight
Silver	7440-22-4	100

**Toxicological Data on Ingredients:** Silver: ORAL (LD50): Acute: 100 mg/kg [Mouse].

#### Section 3: Hazards Identification

##### Potential Acute Health Effects:

Very hazardous in case of eye contact (irritant), of ingestion, of inhalation. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching.

##### Potential Chronic Health Effects:

CARCINOGENIC EFFECTS: Not available. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. Repeated exposure to an highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

#### Section 4: First Aid Measures

**Eye Contact:** Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

**Skin Contact:** No known effect on skin contact, rinse with water for a few minutes.



**Serious Skin Contact:** Not available.

**Inhalation:** Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**

Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** May be combustible at high temperature.

**Auto-Ignition Temperature:** Not available.

**Flash Points:** Not available.

**Flammable Limits:** Not available.

**Products of Combustion:** Some metallic oxides.

**Fire Hazards in Presence of Various Substances:** Not available.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:** Not available.

## Section 6: Accidental Release Measures

**Small Spill:** Use appropriate tools to put the spilled solid in a convenient waste disposal container.

**Large Spill:**

Use a shovel to put the material into a convenient waste disposal container. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**

Keep locked up Keep away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe dust. Avoid contact with eyes In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label.

**Storage:**

Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Highly toxic or infectious materials should be stored in a separate locked safety storage cabinet or room.

## Section 8: Exposure Controls/Personal Protection

### Engineering Controls:

Use process enclosures, local exhaust ventilation, or other engineering controls to keep airborne levels below recommended exposure limits. If user operations generate dust, fume or mist, use ventilation to keep exposure to airborne contaminants below the exposure limit.

**Personal Protection:** Splash goggles. Lab coat.

### Personal Protection in Case of a Large Spill:

Splash goggles. Full suit. Boots. Gloves. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

### Exposure Limits:

TWA: 0.01 (mg/m<sup>3</sup>) from OSHA (PEL) TWA: 0.01 (mg/m<sup>3</sup>) from OSHA NIOSH Australia: TWA: 0.1 (mg/m<sup>3</sup>) Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Solid. (Solid metallic powder. Metal solid.)

**Odor:** Not available.

**Taste:** Not available.

**Molecular Weight:** 107.87 g/mole

**Color:** Not available.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 2212°C (4013.6°F)

**Melting Point:** 961°C (1761.8°F)

**Critical Temperature:** Not available.

**Specific Gravity:** 10.4 (Water = 1)

**Vapor Pressure:** Not applicable.

**Vapor Density:** Not available.

**Volatility:** Not available.

**Odor Threshold:** Not available.

**Water/Oil Dist. Coeff.:** Not available.

**Ionicity (in Water):** Not available.

**Dispersion Properties:** Is not dispersed in cold water, hot water.

**Solubility:** Insoluble in cold water, hot water.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Not available.

**Incompatibility with various substances:** Not available.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:** Not available.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** No.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:** Acute oral toxicity (LD50): 100 mg/kg [Mouse].

**Chronic Effects on Humans:** Not available.

**Other Toxic Effects on Humans:** Very hazardous in case of ingestion, of inhalation.

**Special Remarks on Toxicity to Animals:** Not available.

**Special Remarks on Chronic Effects on Humans:** Not available.

**Special Remarks on other Toxic Effects on Humans:** Not available.

## Section 12: Ecological Information

**Ecotoxicity:** Not available.

**BOD5 and COD:** Not available.

**Products of Biodegradation:**

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are as toxic as the original product.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**

## Section 14: Transport Information

**DOT Classification:**

**Identification:**

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**

Rhode Island RTK hazardous substances: Silver Pennsylvania RTK: Silver Minnesota: Silver Massachusetts RTK: Silver New Jersey: Silver TSCA 8(b) inventory: Silver TSCA 8(a) PAIR: Silver TSCA 8(d) H and S data reporting: Silver SARA 313 toxic chemical notification and release reporting: Silver: 1% CERCLA: Hazardous substances.: Silver: 1000 lbs. (453.6 kg)

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**

CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC). CLASS D-2B: Material causing other toxic effects (TOXIC).

**DSCL (EEC):** R41- Risk of serious damage to eyes.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 1

**Reactivity:** 0

**Personal Protection:** j

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 1

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Not applicable. Lab coat. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

**Section 16: Other Information**

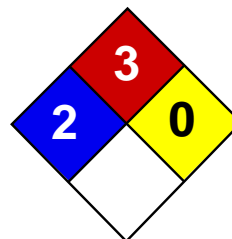
**References:** Not available.

**Other Special Considerations:** Not available.

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Health	2
Fire	3
Reactivity	0
Personal Protection	H

## Material Safety Data Sheet

### Toluene MSDS

#### Section 1: Chemical Product and Company Identification

**Product Name:** Toluene

**Catalog Codes:** SLT2857, SLT3277

**CAS#:** 108-88-3

**RTECS:** XS5250000

**TSCA:** TSCA 8(b) inventory: Toluene

**CI#:** Not available.

**Synonym:** Toluol, Tolu-Sol; Methylbenzene; Methacide; Phenylmethane; Methylbenzol

**Chemical Name:** Toluene

**Chemical Formula:** C<sub>6</sub>H<sub>5</sub>-CH<sub>3</sub> or C<sub>7</sub>H<sub>8</sub>

**Contact Information:**

**Sciencelab.com, Inc.**

14025 Smith Rd.

Houston, Texas 77396

US Sales: **1-800-901-7247**

International Sales: **1-281-441-4400**

Order Online: [ScienceLab.com](http://ScienceLab.com)

**CHEMTREC (24HR Emergency Telephone), call:**

1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

#### Section 2: Composition and Information on Ingredients

**Composition:**

Name	CAS #	% by Weight
Toluene	108-88-3	100

**Toxicological Data on Ingredients:** Toluene: ORAL (LD50): Acute: 636 mg/kg [Rat]. DERMAL (LD50): Acute: 14100 mg/kg [Rabbit]. VAPOR (LC50): Acute: 49000 mg/m 4 hours [Rat]. 440 ppm 24 hours [Mouse].

#### Section 3: Hazards Identification

**Potential Acute Health Effects:**

Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

**Potential Chronic Health Effects:**

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Not available. The substance may be toxic to blood, kidneys, the nervous system, liver, brain, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

#### Section 4: First Aid Measures

**Eye Contact:**

Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention.

**Skin Contact:**

In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**

Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

**Inhalation:**

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention.

**Serious Inhalation:**

Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek medical attention.

**Ingestion:**

Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If large quantities of this material are swallowed, call a physician immediately. Loosen tight clothing such as a collar, tie, belt or waistband.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 480°C (896°F)

**Flash Points:** CLOSED CUP: 4.4444°C (40°F). (Setaflash) OPEN CUP: 16°C (60.8°F).

**Flammable Limits:** LOWER: 1.1% UPPER: 7.1%

**Products of Combustion:** These products are carbon oxides (CO, CO<sub>2</sub>).

**Fire Hazards in Presence of Various Substances:**

Flammable in presence of open flames and sparks, of heat. Non-flammable in presence of shocks.

**Explosion Hazards in Presence of Various Substances:**

Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

**Fire Fighting Media and Instructions:**

Flammable liquid, insoluble in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use water spray or fog.

**Special Remarks on Fire Hazards:** Not available.

**Special Remarks on Explosion Hazards:**

Toluene forms explosive reaction with 1,3-dichloro-5,5-dimethyl-2,4-imidazolididione; dinitrogen tetraoxide; concentrated nitric acid, sulfuric acid + nitric acid; N<sub>2</sub>O<sub>4</sub>; AgClO<sub>4</sub>; BrF<sub>3</sub>; Uranium hexafluoride; sulfur dichloride. Also forms an explosive mixture with tetranitromethane.

## Section 6: Accidental Release Measures

**Small Spill:** Absorb with an inert material and put the spilled material in an appropriate waste disposal.

**Large Spill:**

Toxic flammable liquid, insoluble or very slightly soluble in water. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

**Section 7: Handling and Storage****Precautions:**

Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents.

**Storage:**

Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame).

**Section 8: Exposure Controls/Personal Protection****Engineering Controls:**

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**

Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

**Personal Protection in Case of a Large Spill:**

Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**

TWA: 200 STEL: 500 CEIL: 300 (ppm) from OSHA (PEL) [United States] TWA: 50 (ppm) from ACGIH (TLV) [United States] SKIN TWA: 100 STEL: 150 from NIOSH [United States] TWA: 375 STEL: 560 (mg/m<sup>3</sup>) from NIOSH [United States] Consult local authorities for acceptable exposure limits.

**Section 9: Physical and Chemical Properties**

**Physical state and appearance:** Liquid.

**Odor:** Sweet, pungent, Benzene-like.

**Taste:** Not available.

**Molecular Weight:** 92.14 g/mole

**Color:** Colorless.

**pH (1% soln/water):** Not applicable.

**Boiling Point:** 110.6°C (231.1°F)

**Melting Point:** -95°C (-139°F)

**Critical Temperature:** 318.6°C (605.5°F)

**Specific Gravity:** 0.8636 (Water = 1)

**Vapor Pressure:** 3.8 kPa (@ 25°C)

**Vapor Density:** 3.1 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 1.6 ppm

**Water/Oil Dist. Coeff.:** The product is more soluble in oil; log(oil/water) = 2.7

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, diethyl ether, acetone.

**Solubility:**

Soluble in diethyl ether, acetone. Practically insoluble in cold water. Soluble in ethanol, benzene, chloroform, glacial acetic acid, carbon disulfide. Solubility in water: 0.561 g/l @ 25 deg. C.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Heat, ignition sources (flames, sparks, static), incompatible materials

**Incompatibility with various substances:** Reactive with oxidizing agents.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**

Incompatible with strong oxidizers, silver perchlorate, sodium difluoride, Tetranitromethane, Uranium Hexafluoride. Frozen Bromine Trifluoride reacts violently with Toluene at -80 deg. C. Reacts chemically with nitrogen oxides, or halogens to form nitrotoluene, nitrobenzene, and nitrophenol and halogenated products, respectively.

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:**

WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 636 mg/kg [Rat]. Acute dermal toxicity (LD50): 14100 mg/kg [Rabbit]. Acute toxicity of the vapor (LC50): 440 24 hours [Mouse].

**Chronic Effects on Humans:**

CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH, 3 (Not classifiable for human.) by IARC. May cause damage to the following organs: blood, kidneys, the nervous system, liver, brain, central nervous system (CNS).

**Other Toxic Effects on Humans:**

Hazardous in case of skin contact (irritant), of ingestion, of inhalation. Slightly hazardous in case of skin contact (permeator).

**Special Remarks on Toxicity to Animals:**

Lowest Published Lethal Dose: LDL [Human] - Route: Oral; Dose: 50 mg/kg LCL [Rabbit] - Route: Inhalation; Dose: 55000 ppm/40min

**Special Remarks on Chronic Effects on Humans:**

Detected in maternal milk in human. Passes through the placental barrier in human. Embryotoxic and/or foetotoxic in animal. May cause adverse reproductive effects and birth defects (teratogenic). May affect genetic material (mutagenic)

**Special Remarks on other Toxic Effects on Humans:**



Acute Potential Health Effects: Skin: Causes mild to moderate skin irritation. It can be absorbed to some extent through the skin. Eyes: Causes mild to moderate eye irritation with a burning sensation. Splash contact with eyes also causes conjunctivitis, blepharospasm, corneal edema, corneal abrasions. This usually resolves in 2 days. Inhalation: Inhalation of vapor may cause respiratory tract irritation causing coughing and wheezing, and nasal discharge. Inhalation of high concentrations may affect behavior and cause central nervous system effects characterized by nausea, headache, dizziness, tremors, restlessness, lightheadedness, exhilaration, memory loss, insomnia, impaired reaction time, drowsiness, ataxia, hallucinations, somnolence, muscle contraction or spasticity, unconsciousness and coma. Inhalation of high concentration of vapor may also affect the cardiovascular system (rapid heart beat, heart palpitations, increased or decreased blood pressure, dysrhythmia, ), respiration (acute pulmonary edema, respiratory depression, apnea, asphyxia), cause vision disturbances and dilated pupils, and cause loss of appetite. Ingestion: Aspiration hazard. Aspiration of Toluene into the lungs may cause chemical pneumonitis. May cause irritation of the digestive tract with nausea, vomiting, pain. May have effects similar to that of acute inhalation. Chronic Potential Health Effects: Inhalation and Ingestion: Prolonged or repeated exposure via inhalation may cause central nervous system and cardiovascular symptoms similar to that of acute inhalation and ingestion as well liver damage/failure, kidney damage/failure (with hematuria, proteinuria, oliguria, renal tubular acidosis), brain damage, weight loss, blood (pigmented or nucleated red blood cells, changes in white blood cell count), bone marrow changes, electrolyte imbalances (Hypokalemia, Hypophosphatemia), severe, muscle weakness and Rhabdomyolysis. Skin: Repeated or prolonged skin contact may cause defatting dermatitis.

## Section 12: Ecological Information

### Ecotoxicity:

Ecotoxicity in water (LC50): 313 mg/l 48 hours [Daphnia (daphnia)]. 17 mg/l 24 hours [Fish (Blue Gill)]. 13 mg/l 96 hours [Fish (Blue Gill)]. 56 mg/l 24 hours [Fish (Fathead minnow)]. 34 mg/l 96 hours [Fish (Fathead minnow)]. 56.8 ppm any hours [Fish (Goldfish)].

**BOD5 and COD:** Not available.

### Products of Biodegradation:

Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The products of degradation are less toxic than the product itself.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

### Waste Disposal:

Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** CLASS 3: Flammable liquid.

**Identification:** : Toluene UNNA: 1294 PG: II

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

### Federal and State Regulations:

California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Toluene California prop. 65 (no significant risk level): Toluene: 7 mg/day (value) California prop. 65 (acceptable daily intake level): Toluene: 7 mg/day (value) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Toluene Connecticut hazardous material survey.: Toluene Illinois

toxic substances disclosure to employee act: Toluene Illinois chemical safety act: Toluene New York release reporting list: Toluene Rhode Island RTK hazardous substances: Toluene Pennsylvania RTK: Toluene Florida: Toluene Minnesota: Toluene Michigan critical material: Toluene Massachusetts RTK: Toluene Massachusetts spill list: Toluene New Jersey: Toluene New Jersey spill list: Toluene Louisiana spill reporting: Toluene California Director's List of Hazardous Substances.: Toluene TSCA 8(b) inventory: Toluene TSCA 8(d) H and S data reporting: Toluene: Effective date: 10/04/82; Sunset Date: 10/0/92 SARA 313 toxic chemical notification and release reporting: Toluene CERCLA: Hazardous substances.: Toluene: 1000 lbs. (453.6 kg)

**Other Regulations:**

OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**

CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**

R11- Highly flammable. R20- Harmful by inhalation. S16- Keep away from sources of ignition - No smoking. S25- Avoid contact with eyes. S29- Do not empty into drains. S33- Take precautionary measures against static discharges.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 3

**Reactivity:** 0

**Personal Protection:** h

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 3

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**

Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

**References:** Not available.

**Other Special Considerations:** Not available.

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## **ATTACHMENT B**

### **PERSONAL HYGIENE AND DECONTAMINATION**

### **a) Personnel Airlock and Decon Area**

A decontamination/Contamination reduction zone (CRZ) area will be set up on visqueen laid on the floor for decontamination.

### **b) Donning Personal Protective Equipment**

The following procedures will be followed for putting on PPE for work in the work zone:

- All PPE must be donned before entering the site.
- All employees working on-site will have PPE available as described in the Health and Safety Plan (HASP), Level D or Level C (if needed) as prescribed by the Site Safety and Health officer (SSHO).
- All employees will be trained in the use of any PPE necessary to perform their duties.
- If protective suits, boots, and gloves are prescribed by the SSHO, employees shall tape the gloves and boots to the protective suit to prevent contamination from penetrating the space between the protective suit and the gloves and boots.
- If respirators are prescribed by the SSHO, the respirators will be thoroughly inspected prior to donning the respirator. New cartridges will be installed on a daily basis. A positive/negative fit check shall be performed each time the respirator is donned.

### **c) Doffing Personal Protective Equipment**

The following procedures will be followed for removal of PPE (when required):

- While in CRZ, remove outer tape, latex booties and gloves. Throw tape, booties, and gloves away in designated containers.
- Remove respirator (if used) and throw cartridges into the designated container (throw cartridges away at the end of shift).
- Remove the outer PPE (Tyvek, etc.) and place in the designated container.
- Use water or wet wipes to wash hands, forearms and face. Towel off and place trash in designated containers.

### **d) Personal Hygiene/Sanitation**

Personnel working on the project will use restrooms that are on-site.

All employees working on-site will follow the rules established below. Employees found to be disregarding the rules will be barred from the Site.

- Eating, drinking, chewing gum, chewing tobacco, smoking, or any practice that increases the probability of hand-to-mouth transfer and ingestion of material is prohibited in the work areas.
- Hands, face, and forearms must be thoroughly washed upon leaving a contaminated or suspected contaminated area before eating, drinking, or performing any other activities that might involve hand-to-mouth contact thereby increasing the potential of ingesting contaminants.
- Employees will be required to clean themselves including the washing of hair (only if required), at the end of each shift.
- Removal of materials from protective clothing or equipment by blowing, shaking, or any other means that may disperse materials into the air, will be prohibited.

## **e) Medical Emergency Decontamination Procedures**

The following procedures are to be used for providing emergency medical treatment to personnel sustaining injury while working in the exclusion area of the Site.

The procedures are to be used by Site/safety personnel, emergency medical staff/ambulance crew members, and hospital emergency room staff ONLY when the nature of the medical emergency supersedes standard operating procedures for chemical decontamination when exiting the exclusion area for the chemical hazards associated with this Site.

The primary acute chemical hazards are generally from low-level, direct dermal exposure, typically only causing a skin rash upon exposure. Although specific contaminants, by nature, must be dealt with on a case-by-case basis, these procedures generally will be followed:

### Injury with Potential for Contact with Lightly Contaminated Clothing; Uncontaminated Skin

An initial assessment of the injured person will be performed first, to determine if the employee has suffered a spinal/head injury. Potential spinal/head injuries may require PPE to be left on the injured employee. If the initial assessment does not provide evidence of a spinal/head injury, all protective clothing (hard hat, outer boots, and gloves) will be removed by personnel at the Site before the injured person is transferred to an ambulance. This can be performed anywhere on-site although when at all possible, it should be performed at the hot line, break area, or emergency exit. Standard untaping and washing procedures may be eliminated if necessary. Protective clothing may simply be removed to minimize cross contamination. In extreme circumstances, protective clothing may be removed by cutting it with a scissors or a knife. This emergency clothing removal takes less than one minute to perform and virtually eliminates the chances of contaminating any emergency vehicles, emergency staff, and emergency room facilities. Pre-surgery preparation for the injured person would consist of normal soap and water rinsing.

### Injury Involving Potential for Contact with Contaminated Outer Clothing; Uncontaminated Skin

The same procedure as above should be used. The staff performing the emergency clothing removal will be required to thoroughly decontaminate themselves after the incident.

### Injury Involving Potential for Contact with Contaminated Clothing; Contaminated Skin

None of the contaminants reasonably expected from this Site are acutely hazardous or toxic at the "trace" levels (i.e., that which would be soaked into or onto clothing).